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FRATERNA

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Hoya lasiantha Korthals ex Blume
Photo by Torill Nyhuus

INTERNATIONAL HOYA ASSOCIATION

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Fraterna

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The President's Message

By Dr. Harriette Schapiro

It is the start of a new year and a new millennium. Much is happening in the IHA. The Fraterna will have more color and pictures than before. New articles by new authors are in the works. The new web site is under construction and will be underway soon.

Our editor, Dale Kloppenburg, has just published a new book, *The World of Hoyas*. It was available at the recent San Diego Hoya Group Holiday party and sold more copies than expected. It is right beside me as I write this message. It is loaded with photos of both flowers and foliage of our favorite plant.

Now, during the quiet time of the plant year, try something new. Get active in the IHA and in promoting interest in hoyas. Make some cuttings of species you particularly like and pass them along to other plant people. They make a great house gift. It doesn't take much to spark interest in our favorite plants. Join a Robin . It's a great opportunity to learn more about hoyas from people in other parts of the world. It is amazing as to the number and enthusiasm of growers in Finland and Sweden. These people manage to grow and bloom these tropical plants under totally different conditions.

Right now in Southern California, it is a very dry winter with no sign of rain being able to make it down to the lower half of the state. I am still on close to a summer watering schedule. As most of my hoyas are out of doors, I am having problems watering them without causing root rot. Just to add to my plant woes, one of the cables that hold up my hanging pots broke. It will be interesting to see what survived. At this time, all I can do is hope for better weather for hoyas. Spring will come and plants will grow.

May your hoyas grow and the mealy bugs stay away.

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Breeding Hoyas: An introduction

By Edward Gilding

In the following series of articles is an attempt to provide a succinct introduction to the matter regarding sexual reproduction of hoya plants. Most plants of this genus are reproduced easily by vegetative means. This ease of asexual reproduction has left little desire to explore the sexual reproduction of hoyas in cultivation.

The first article in the series explores the possibility of using pollination as a means of propagation and selection of novel cultivars. As well as suggestions for line-breeding, a few ideas are proposed regarding the hybridization of plants within the genus Hoya. Article two describes the parts of a hoya flower, the tools involved, and the process itself. The last article contains information about the portion of the hoya life cycle that so few of us have experienced, namely follicle development, harvesting of hoya seed, and the raising of seedlings.

As I write these words many questions remain without conclusive evidence. Here is a chance for growers to contribute their observations on the matter of self-fertility, and what inhibits pollen tube growth in hoya pollen. If more than three pollinia are successfully inserted, does that mean two follicles will develop rather than the usual single follicle? The subjects broached in this series are vast. Plant breeding and genetics is a science onto itself, as is the subject of plant morphology. It is hoped that growers worldwide will attempt to pollinate hoyas and spark an interest in these matters. Detailed publications regarding plant breeding already exist. Below you will find reference books about the subject of plant breeding geared towards the general public. I, as the author, hope you gain some insight into the apparently mysterious subject of hoya pollination.

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Breeding Hoyas: The Potential.

The species that are currently in the genus Hoya number in the hundreds. Of these species one can find many types, from vines to bushes, leaves that are small to large and flowers in every color except shades of blue. Hoya species represent a greatly under-realized resource for hybridization and selection of unique cultivars. Why has all this potential gone untapped? Firstly, as it is with most plants in Asclepiadaceae, it is difficult to pollinate, and get subsequent fertilization. Secondly not all species will interbreed with another species readily. One must understand which species is within what complex of species, an ability that comes only with trial, error, and observation. With this article, I hope to inspire growers who are forward thinkers and enjoy a good challenge to start a breeding program with the genus Hoya.

Each plant is unique. While that is obvious to some, it would be important to emphasize at this point that each seed-grown plant represents a unique combination of traits. These traits are a combination of both parents that were involved with the production of seed. The term clone is used to denote a plant that has been asexually propagated from a specified mother plant. Asexual reproduction by its' nature does not entail the introduction of genetic changes due to the mixing of genetic material between male and female gametes. Therefore all plants that are reproduced by asexual means, be it cuttings or tissue-cultured plantlets, are generally genetically identical to the mother plant. Two different clones of the same species may have very different flowering times, fragrance, leaf shape, etc.

At this point in time, hoya-growers trade and sell one or just a few clones of a particular species. Unfortunately some species were only found once in recent times. Wouldn't it be interesting to see different clones of some species? Searching for a different clone means introducing genetic variation, which is possible with sexual reproduction. Sexual reproduction involves the joining of sperm and egg cells. Whenever the pollen from one clone is used to fertilize a different clone the resulting offspring is considered a hybrid (even if both parents are of the same species). In the process of sexual reproduction some traits are taken from the female and others from the male. Each of the resulting seeds would be unique. If we had a batch of *H. darwinii* seeds, we might find a clone that grew with more vigor than the clones already in the hobby. How about an upright *H. paziae*, or a scentless *H. fusco-marginata*? Maybe a seedling might be variegated, or dwarfed. Of course finding such clones in a batch of seedlings would mean patience, and perseverance.

Hoya multiflora is a species that is ripe for cultivar selection. There are several clones available, some have flecked leaves, others are green, some have yellow-green flowers while one clone from the Philippines reportedly has pinkish flowers. Most flower readily, take up little room and have some traits that could be exploited. We could raise a group of seedlings and select those with the most silver flecks on the leaves to get a plant that is interesting both in and out of flower. Two of the seedlings with the heaviest flecking could be crossed and a few of the resulting offspring might have even heavier flecking. Other traits that could be realized are pure yellow flowers or if one was particularly ambitious, pink flowers. This type of breeding is usually known as line breeding, which involves the preservation and/or magnification of certain existing traits by breeding between siblings and backcrossing to parents.

Sometimes, a hybridizer would like to cross two different species. Within the genus Hoya however, such crosses usually only result in fertilization and viable seeds if the parents are within the same section or group of species. For instance it would be much more feasible to pursue a cross between *H. cumingiana* and *H. golamcoiana* than a cross between *H. cumingiana* and *H. archboldiana.* However, hoya hybridization is still in its' infancy; some things regarded as improbable might be possible.

There is potential everywhere in the genus. *H. macrophylla* has a fascinating trait of making long, bare stems from which only peduncles are produced. Perhaps a cross with the related *H. purpureo-fusca* would increase flower size. Maybe a cross between *H. macrophylla* and *H. subquintuplinervis* could yield a compact plant with large beautiful leaves. Or maybe crosses involving *H. subcalva* (aka BSI-1), *H. ischnopus*, *H. leuchorhoda*, *H. chlorantha* and *H. montana* could result in some beautiful and floriferous potted vines.

One of the authors' programs involves the species within the distinct group known as Eriostemma. These species are capable of cultivation as terrestrials without protection from the tropical sun. The goal of such a program is to select and breed for plants that bloom profusely and hold their flowers upright or laterally with reflexed corolla lobes. Such plants could be grown as vines for a trellis or for use as a lei flower. The group is noted as being difficult to flower in the greenhouse and rather cold sensitive.

It would be unwise to distribute seedlings of interspecie crosses, and in my opinion only a few clones of a particular interspecie hybrid should be named and/or distributed. The taxonomy of hoya species is in poor shape at this time and it would be harmful to release a number of unique, different seedlings to fellow growers. No matter how well they are labeled one of the plants will have a name misapplied to it. Or if the label is lost the plant might later be treated as a naturally occurring species. Therefore it is not only important to label hybrid plants, but to release just one or a few clones of a cross.

Another project for those who want to help hoya conservation would be to raise hoya species from seed for distribution. Such an operation would make more sense in terms of conservation, as it would disperse genetically unique plants to collections around the world. Breeders of other plants find that some types of plants do not produce strong offspring if they are inbred for several generations. These types of plants are known as outbreeders. In my opinion it would be wise to make crosses within a species from two different wild clones.

Besides the many interesting plants that one could breed for in the course of hybridization, the breeder reserves the right to apply a name to the resulting clone. It can be a name to honor someone or a name of whimsy. With such charming group of plants, why not give specie propagation or cultivar selection a try?

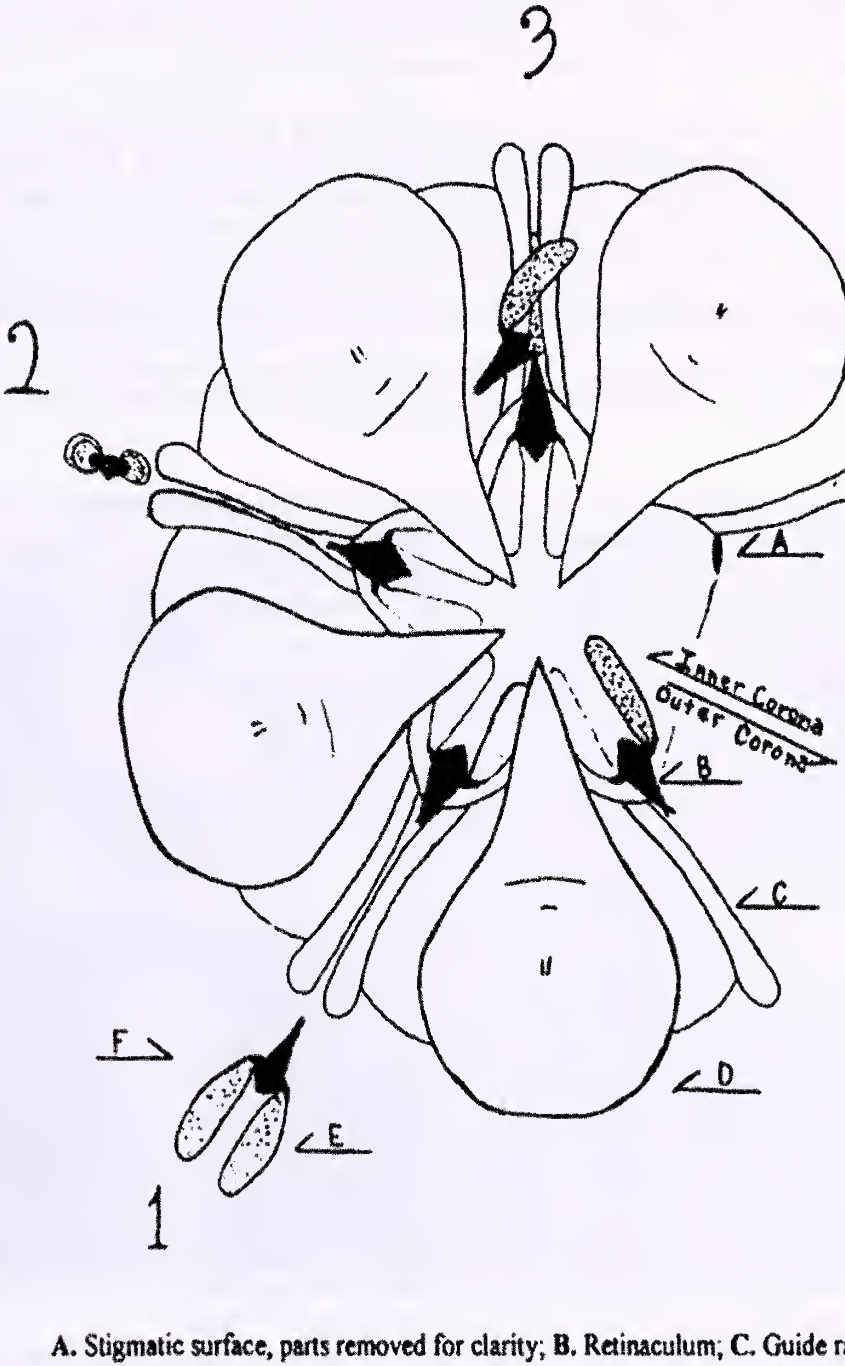
Breeding Hoyas: Pods, Harvesting, and Raising the Seeds

Why raise a hoya plant from seed? There are many ways in which seed raising can be rewarding. By raising a batch of seedlings, it is possible to appreciate the diversity of a particular species. Each seed represents a unique combination of genetic material. Primary crosses, or crosses between two species tend to have offspring that are visually identical to each other. Perhaps you will find a trait that a seedling may carry is unique, and this may be a possible direction in which to drive a breeding program. Of course, the fact that one has raised an adult blooming plant from tiny seed is a matter of pride. From flower, to fruit, to seed, to flower, it is a great chance to understand these plants better.

Hoya pods, also known as follicles, appear in a variety of shapes, textures and color patterns. For instance, the pods of *H. incrassata* tend to be reticulated in purple, bronze and green, while others are green with a red blush as in *H. cumingiana.* Most species bear pods that are long and rather thin in cross-section. *Hoya imperialis* bears large cigar shaped pods. Then there are the plants in section Eriostemma, the pods of which may be shaped as a mango or as one that is developing on a fence in my front yard, 21cm long and 6cm (ca. 8” x 2”) in diameter. Pods often grow quickly once they emerge from the calyx. Once the mature size is reached, the pod becomes firm. It may take many months for a pod to ripen.

Here is a brief explanation of the various methods and tips regarding the germination and raising of hoya seedlings. First, it is most important that one starts with a fresh batch of seed.

Stylized Representation of a Corona belonging to a Hoya



A. Stigmatic surface, parts removed for clarity; **B.** Retinaculum; **C.** Guide rail; **D.** Corona lobe; **E.** Pollinium; **F.** Pollinarium. **1.** Pollinarium removed and in correct orientation in relation to corona. **2.** Pollinarium resting in correct position before insertion into guide rails. **3.** Successful insertion of pollinium by dragging retinaculum towards the inner corona using a pollination tool. *Note: One pollinium is in the guide rails while, the other is resting on the guide rails.*

Try to sow the seed on the day of harvest or as soon as possible thereafter. Some species seem to remain viable for one week, while others may last a month or longer. In all cases, the longer the interval between harvest and sowing means a lower germination rate. On numerous occasions I have harvested pods before they have matured. The seed from unopened pods are easier to clean. I find the perfect stage by twisting the pod along its' length gently. Every few days would be a good time to check. As a safety measure, I place a nylon stocking around the pod once it stops growing so the seed will not be blown away if it isn't harvested early. If unsure of the right time, it is always a good idea to let it mature naturally.

Remove as much of the seed floss as possible. Do this in a room without a draft. It helps to have a bowl of soapy water to place the floss. At first this process is tedious and time consuming. Begin by grabbing the floss, then shake or bang the seed against the paper. Majority of the seed usually falls free. In my experience if the floss is not removed, dampening-off will infect the young plants. Dampening-off is the name of a disease that is the scourge of seedlings. The symptoms are rootless seedlings that wither and die. In bad cases, the disease will "melt" a majority of the seedlings and weaken the rest. If scheduled fungicide-bactericide is not followed it is possible to lose all the seedlings. Once the seedlings make a few pairs of true leaves, they tend to be strong enough to cope with the disease and one can stop the application of a fungicide-bactericide.

Some growers sprout a batch of 50 seeds in a six-inch (circa 15cm) pot. This batch-method saves space on the bench and is perfect in crosses where you are selecting for vigor or where each seedling is not important. Be aware of the fact that seedlings seem to grow faster when they are surrounded by other seedlings. This phenomenon is probably due to competition of light, not actual vigor. Therefore count how many leaves or nodes a seedling has as a measurement of vigor. Another quirk of this batch-method is that once dampening-off disease starts, it will quickly spread. Within days it is possible to lose a whole batch.

For those who have a lot of time and space, it is possible to raise seedlings in flats. Plastic flats with a cell-grid design of 1 ½ inch (37mm x 37mm) pots allows for the placement of 1-3 seeds per cell. This allows for quicker evaluation of seedlings and slows the spread of dampening-off disease.

Sterile, soil-less potting mix that has been enriched with about 30% fine/medium perlite works well for germination. Once the mix is in the pots or seedling flat, moisten with water from above. This process may take awhile as most potting mixes contain peat moss, which is very hydrophobic once dry. Sow the seed by simply placing the seed on the surface of the moist mix. Hoya seed seems to need light and air-movement in order to germinate well. Once you have placed all of the seed on the surface, sprinkle a fine layer of the dry perlite enriched mix over the seed. This layer should be about 3-4mm thick. It is not a good idea to bury the seed any deeper, as germination rates will suffer. Using a spray bottle set to mist, water the seedlings in with a liquid fungicide suitable for seedlings. I have used copper and sulfur-based compounds for this, but the most effective for me is Consan® Triple Action 20. After spraying with fungicide, some seed will have become exposed. Do not worry, as this is not a problem. The seed should swell and germinate normally.

Place the sown seed in bright, indirect light. Avoid direct sun. Water from below only when the trays or batch-pots seem to be getting dry. It is best to have it on the dry side rather than wet. Do not allow the seedling trays to stand in a saucer of water. Once the soil is moist, remove it from the water. Keep the temperature around 75°-80°F (ca. 41°- 44°C). Spray a fine mist of a fungicide solution on the surface of the seed trays and allow it to soak in. There are special mixing directions for spraying certain fungicides on seedlings. Follow them carefully. I like to spray after the top 3mm (25 mm per inch) or so of the medium as dried out.

Seedlings should appear within a week. In some cases there will be germination within 48 hours. If you notice any pests such as aphids, simply spray them with insecticidal soap. Keep the same conditions until you notice that the seedlings have about a pair or two of new leaves. At this stage you may begin adding ¼ strength fertilizer to the water. I have had success with a balanced 14-14-14 or 10-10-10 fertilizer.

Seedlings will have small bright green leaves for some months. They have a distinct seedling-stage where the young plants will grow upright for awhile with non-adult shaped leaves. Some species produce alternate leaves for a while before showing the usual opposite leaves of the genus. Once the seedling has enough energy to send out a twining shoot it will assume the appearance of an adult plant, and may be treated as such from that point on. It is possible to grow a blooming plant from seed within two years.

LIFE ACHIEVEMENT AWARDS GIVEN

By Chuck Everson

Dale Kloppenburg (L) and Ted Green (R)

It has come to pass that it is time to honor some very valuable members of the I.H.A. As far as the Board of Directors of the I.H.A concerned, it is way overdue. I am talking about Dale

Kloppenburg and Ted Green. These two gentlemen have contributed more of their time and knowledge to the world of hoyas than just about anyone in the world.

The Board of Directors of the International Hoya Association have decided to honor these two gentlemen by unanimously awarding them the I.H.A. Life Achievement Award. To give you some history about these two remarkable men, I conducted separate interviews with both and it is amazing how their lives have paralleled, their interest in botany so much alike, and how their friendship has endured.

Dale and Ted were both born in 1921, and raised in Fresno, California, where they met in the 6th grade, at the age of 12, and playing together in the summers. After graduating from High School, Dale went on to get his BS degree in Plant Genetics at Fresno State, then on to U.C. Berkeley—while Ted went to Fresno State, Northwestern University and then on to the University of Hawaii, where he obtained his BA degree in Biology.

Both served in the U.S. Navy during World War II. Both had pilot's licenses. Both entered as enlisted men in 1941/1942, winding up being officers. When the war was over, Dale went to work as a Rose breeder at Armstrong Nurseries. Ted went to work for the U.S. Department of Agriculture. They met again while both were doing fig research at the California Institute of Fig Research.

It wasn't until 1981 that their mutual interest in hoyas resulted in a desire for joint collaboration, doing field work together for the next 16 years-- with trips to Borneo, the Celebes Islands, the Fiji Islands, and the Philippine Islands. In addition to joint field work, both Ted and Dale have taken separate trips to the above places and also to places like Australia, Indonesia, Suluwesi, Borneo, Samoa, Guam, Yap, Solomon Islands and countless other areas in the pacific—finding new hoyas, collecting and re-collecting hoyas thought to be extinct long ago. Ted has gone on his own to other countries to field botanize and learn more about hoyas: Thailand, Tahiti, New Caledonia, New Hebrides, Indonesia, Western Samoa, New Guinea, and Guadalcanal –just to name a few. (Total trips: 23 in the last 20 years).

It was during this period that this knowledge of hoyas and their habitat, acquired by both individuals started to evolve, culminating with their interest to relay this information through the International Hoya Association (formed in 1988). Dale is a charter member, while Ted got on board a few years later.

Together, Dale and Ted have named and/or described over two dozen hoyas during this period. And their plans do not call for either one of them slowing down. They are planning future trips together—possibly to the upper peninsular of Malaysia, and the east coast of Sumatra.

Ted is still operating his nursery (Green: Plant Research), however Dale decided in 1998 to close his nursery and take a more active role in becoming the editor of Fraterna, and with the remaining free time, writing books on hoyas.

Looking over the lifetime of these two remarkable plantsmen, and with the kind of effort that both men have put forth in the promotion of hoyas, and the promotion of the I.H.A., we now bestow upon them the honor of the prestigious LIFE achievement award.

WE SALUTE YOU, ROBERT DALE KLOPPENBURG AND THEODORE ROOSEVELT GREEN.

ROOTING HOYAS IN WATER

By Merja Jauhanen

This kind of rooting is the best when you have a dry cutting or are unsure about being able to root your hoya cuttings (I have a friend who dug with a spoon to see if her cuttings had roots...)! No need to wonder when the cutting is in water. It is always visible. It is also an easy way when you are in hurry or temporarily out of room.

When unpacking a big hoya order, you have some very dry and almost half dead hoya cuttings and then you may have some that look like they have never been packed - fresh and beautiful. In both cases, it is good to put them into water. I use single node cuttings when they have big leaves (*Hoya macrophylla, imperialis*, etc.) and 2 inch long cuttings when the hoya has small leaves (*Hoya bella, curtisii, lacunosa* etc).

Any kind of water container is suitable. It does not matter if it is clear glass or china etc. Normally they will not start to grow only from a leaf, as african violets do. I prefer clear glass, since you can see how and when roots are developing. The glass should also stand well, so when you put in cuttings they will not fall. I sometimes use liquid plant food in water (e.g. Schultz-Instant) about a half dose.

I put fresh cuttings in water just as they are - not cutting anything. I do not soak whole cuttings in water, only the lower the portion of stem. The leaves do not like to be under water, as they will rot. If the cutting is very dry I make a fresh cut (like making rose cuttings) and then put them in water. The stem should be half woody to root well. Old hardened wood takes a long time to root and young material is slow to root, but they will. With dry cuttings it is good to use additional heat and a propagator. The added humidity is very good for dry thin leaves. Roots can be seen within a few days. Some species like *Hoya obovata* make roots very fast, some like *Hoya multiflora* takes a bit more time. Some produce roots at any place along the stem (e.g. *Hoya carnosa and Hoya pubicalyx*) and some produce roots only under the node (e.g. *Hoya imperialis* and *Hoya magnifica*).

I plant rooted cutting, when roots are about 1/2 inch long. There is no disadvantage in rooting hoya cuttings first in water and then planted into potting mix. I forgot one *Hoya nicholsoniae* a little too long in water and it started to produce a new leaf. I potted it immediately and the leaf continued to grow and it produced a very fine big leaf. The new growth also starts faster when the roots are ready to go. I have rooted about forty hoyas in water and only one has died when in the glass of water. It is still mystery to me why this happened....but all the others are doing fine, spreading all over our flat in Finland.

Merja Jauhanen is a member of IHA and also the Swedish Hoya Society.

A SPECTACULAR FIND
(Cover Photo)

By Torill Nyhuus

If this isn't *Hoya lasiantha*, what is it then?

The first time I heard about **Hoya lasiantha** was on my first trip to Borneo with Ted Green, Dale Kloppenburg, Ed Gilding and Eva-Karin Wiberg in 1997. They talked often about this rare species and made even me eager to find it. I learned that it was a long lost species and that they had been searching for it for years.

We found one species on that trip that had thin enough leaves to be *Hoya lasiantha*. My cutting died and I think it died for the others too. On my second trip we went back to the same place outside Tenom, Borneo, Malaysia and found the same plant along the same trail. Mine died again. I still don't know what it was.

But I heard and learned more about *Hoya lasiantha* from each trip and in April 1999 I joined Ted & Co. for my third collecting trip. We started with a few days on the north part of Sumatra, Indonesia and there we found a few different thin leafed hoyas, *Hoya coronaria*, a caudata type and *Dischidia acutifolia*.

It is easy to loose a cutting with thin leaves when keeping it in a box for two weeks or more, they easy dry away, but I was lucky this time, most of my plants survived. They developed roots, most of them very slowly; but they started to grow and from 25 hoya cuttings from the trip, I have 23 that are still alive. I even have some dischidias.

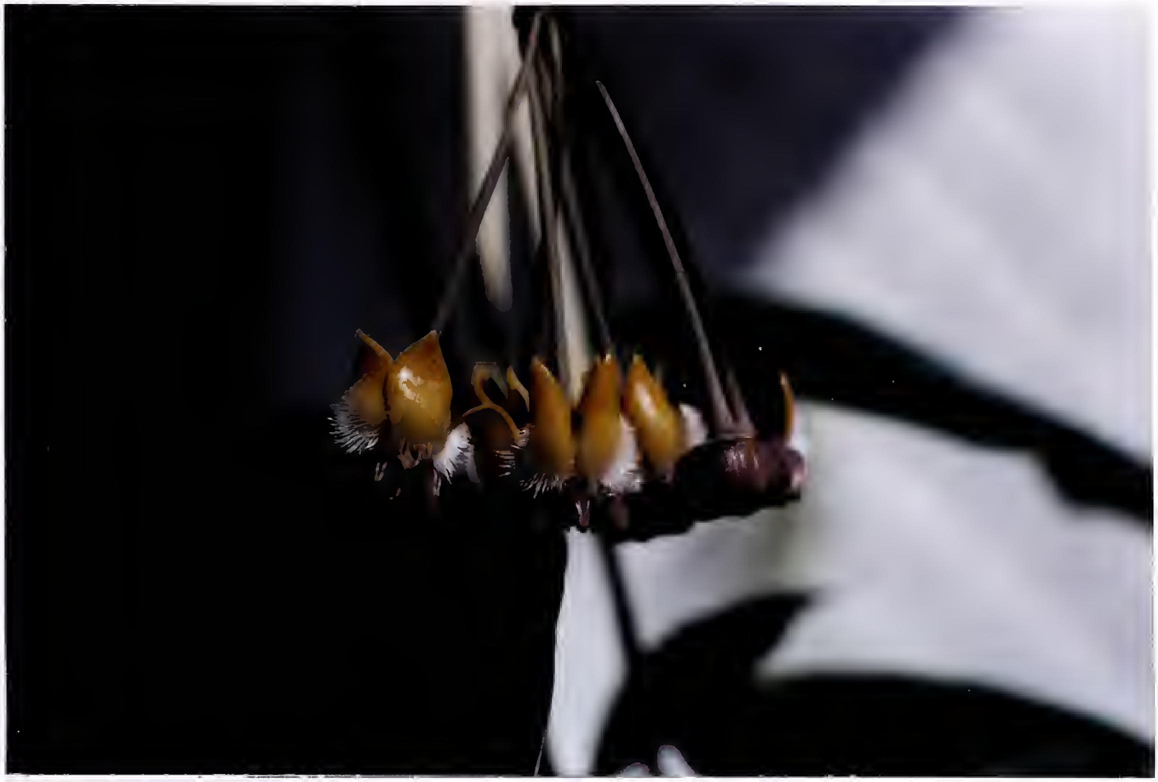
This cutting started to grow and had only four pairs of leaves when it developed the first peduncle. It formed buds at once but the peduncle and the buds turned so yellow or yellow-brown that I was sure they would drop, but they didn't.

On July 1999 I saw the flowers for the first time, There were seven flowers. I have never seen a hoya so pretty!! Sharp orange corolla lobes, and like a snowball of white hair around and the plum colored corona. The flowers lasted a week, but the colors faded a little after five days. It has a nice smell, but I can't tell exactly what it smells like. There is no dripping nectar.

It dropped the peduncle shortly after the flowering, but has developed a new one which is going to bloom for the third time now, it has 14 big buds right now. (9 December 1999)

The plant still has 5 nodes. I pruned it in July just above the second peduncle in hope to get branches, but it hasn't grown more since then. The plant is now ca. 25 cm. high (= 10 inches), the biggest leave are 15 cm. x 6.5 cm. The second peduncle is also more yellow brown than green, so I think that is the normal color and about 5 cm. long (2 inches).

Torill Nyhuus (Board member of the Swedish Hoya Society also known as, Svenska Hoya Sällakapet and member of IHA)
E-mail: torill.nyhuus@capgemini.se



Hoya lasiantha Kothrals ex Miquel
Photo by Torill Nyhuus

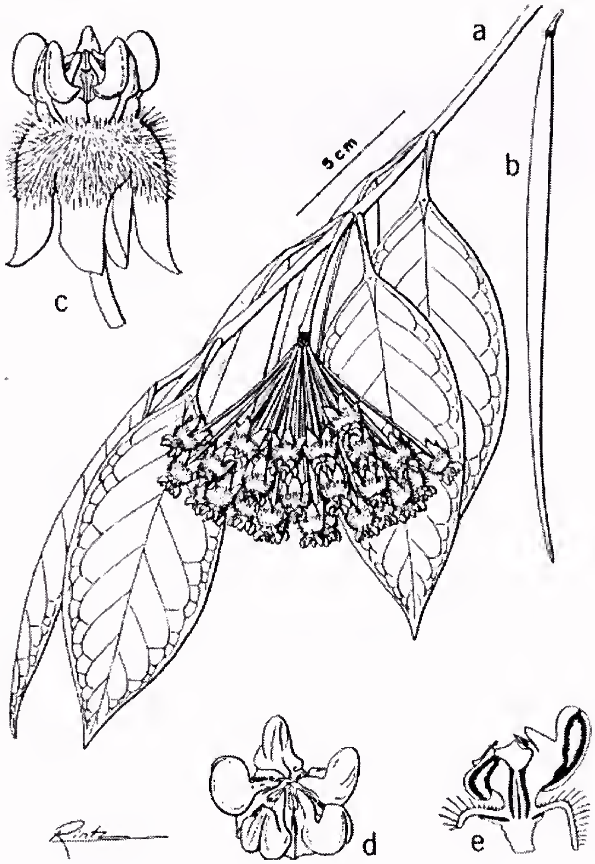
Hoya lasiantha Kothrals ex Miquel
Photo by Torill Nyhuus

Further notes on **Hoya lasiantha** Korthals ex Miquel:

This species was found in the herbarium of Korthals. In 1849 C. L. Blume made a one line reference to the species "Typum hujus Generis refert Hoya lasiantha Herb. Korths., a me Plocostemma dictua". (Calling to mind the type for the genus represented in Korthals Herbarium. as stated by me is Plocostemma. At this time Blume had the genus separated into many different genera. Here he placed the species in the Genus Plocostemma. Later this was made a section of the Genus Hoya. As you can see by the chronological bibliography listing below, Miquel in 1856 wrote fairly extensively of the plant. He placed it in the Genus Hoya.

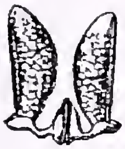
Amongst the literature are some nice detailed drawings of this species. One in Musei Botanicus Lugduma-Batavorum 1(1849)60 FIG.14. Another in Curtis Botanical Magazine, tab. 5081 (1858). Again in De Tropicsche Natuur 1925:88 &91 and the detailed drawings of R. E. Rintz in the Malayan Nature Journal 30/3/4:489 1978.

Fig. 15. *Hoya lasiantba* Korth. a) single branch; b) fruit; c) flower in side view; d) corona in top view; c) flower in median section. From SIW 34247.

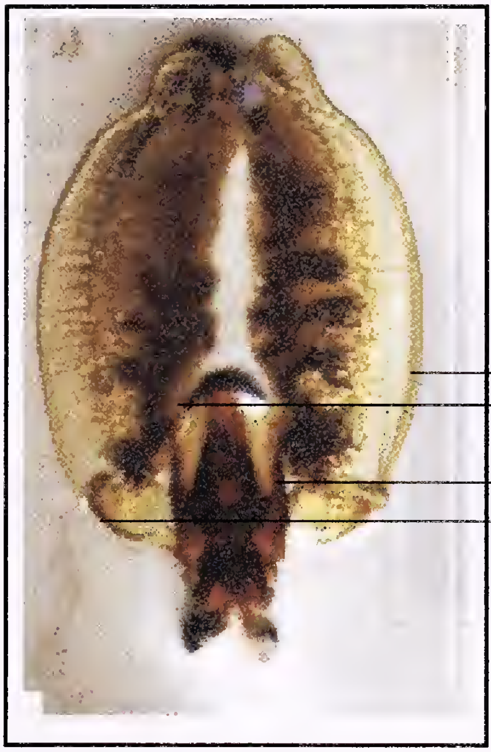


R. E. Rintz's drawing.

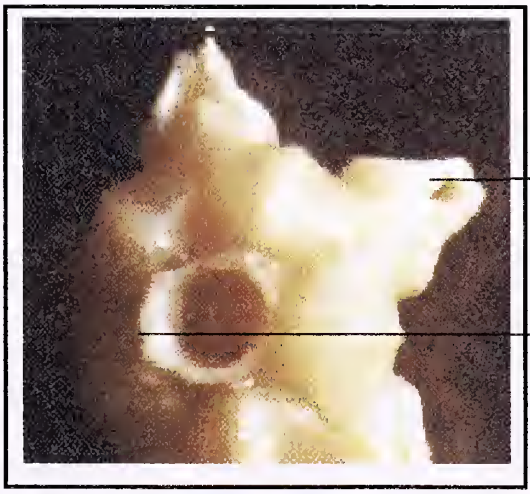
Notations on the Pollinarium



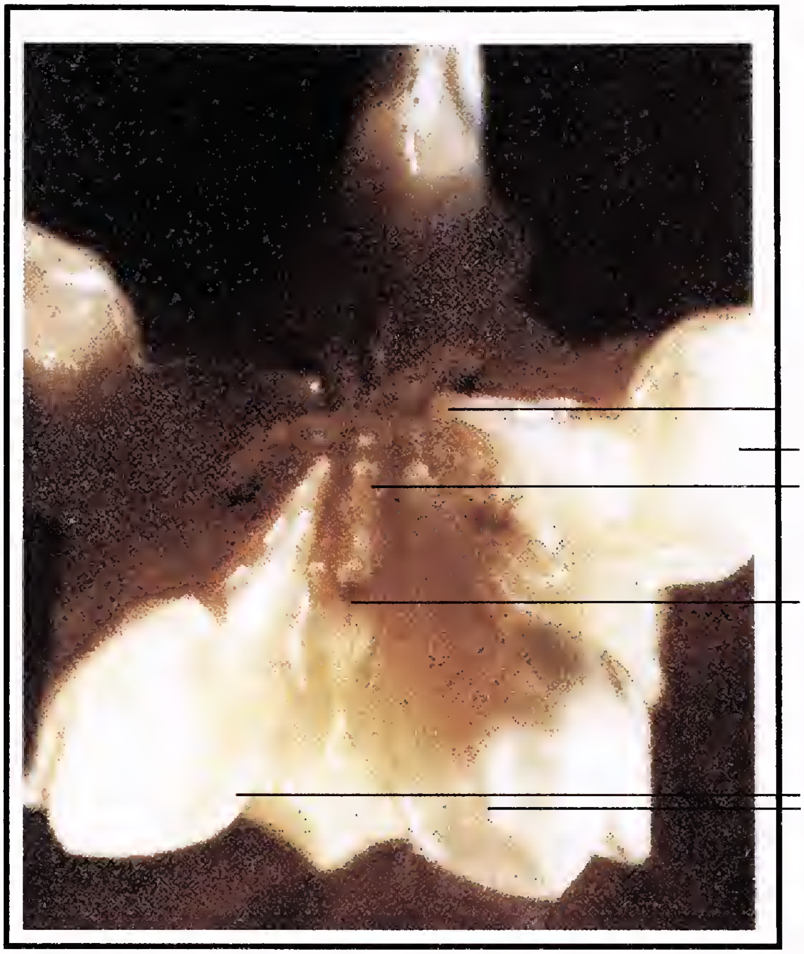
The pollinarium depicted to the right appeared in "Musi Botanicis Lugduno-Batavorum" 1/60(1849) 14. Here there are no caudicles shown or no translator and only caudicles.



This is a photomicrograph of a flower sent by Torill Nyhuus. The pollinia are slightly shriveled from being in alcohol. Note however that there is a narrow distinct translator that widens as it nears the retinaculum. The clear caudicles are rather large. The vacuoles are rather large. Distinctive are the two dark sharp pointed extensions that arise from the top of the retinaculum and point inward. I have observed this only in one other hoya species (*Hoya phyllura* Swartz) and there not as distinct.



Photomicrograph of bottom of crown.



Inner coronal lobe.

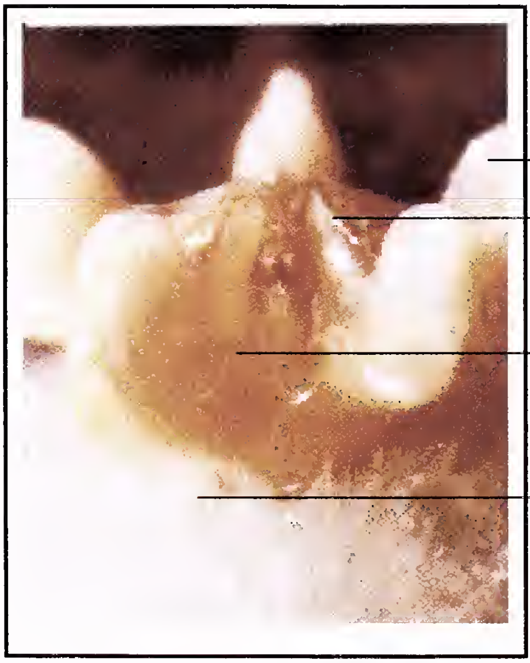
Outer (rounded) coronal lobe

Crepe-like fluting of the the center and extending to the retinaculum.

Retinaculum

Extended lip-like edge to coronal side. Not shown in Rintz's drawing

Side View of Corona approx. 16 X.



Side View of scale.

Outer lobe.

Inner lobe with sharp top edge and small horn on tip.

A very large shield like anther wing that forms one side of the channel leading to the stigmatic receptive area just below the retinaculum

Long white stellate hairs around base of crown arising from the inner portions of the corolla.

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LATEST BREAKING NEWS !!

International Hoya Association is proud to announce that the new IHA Web site is now on line and can be accessed at the following address: www.international-hoya.org

More details will be announced in our next issue of Fraterna.

HOYA DEYKEI Green Sp. n. (Asclepiadaceae)

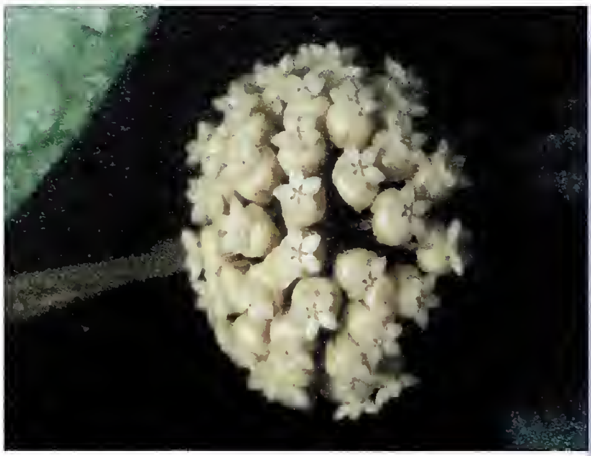
Affinis *Hoyae meredithii* Green sed differens foliis truncatis usque emarginatis et ovatis lobis coronalibus.

Allied to *H. meredithii* Green but differing in having truncate to emarginate leaves and ovate coronal lobes.

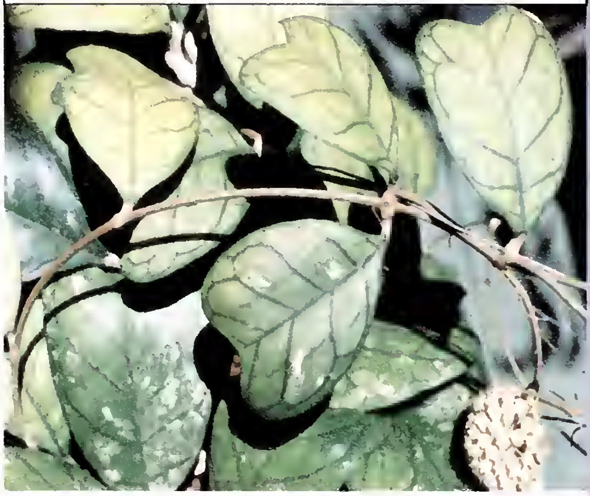
Holotype: Bishop Museum, Ted Green No 9903 ex hort. Ted Green of Kaaawa, Hawaii. From Kebun Raya, Bogor, Indonesia, from Atjeh Barat, Sumatra, Indonesia. Collection no. IPPS 4094, R. van Donkelaar and D. Jannink, 03-90

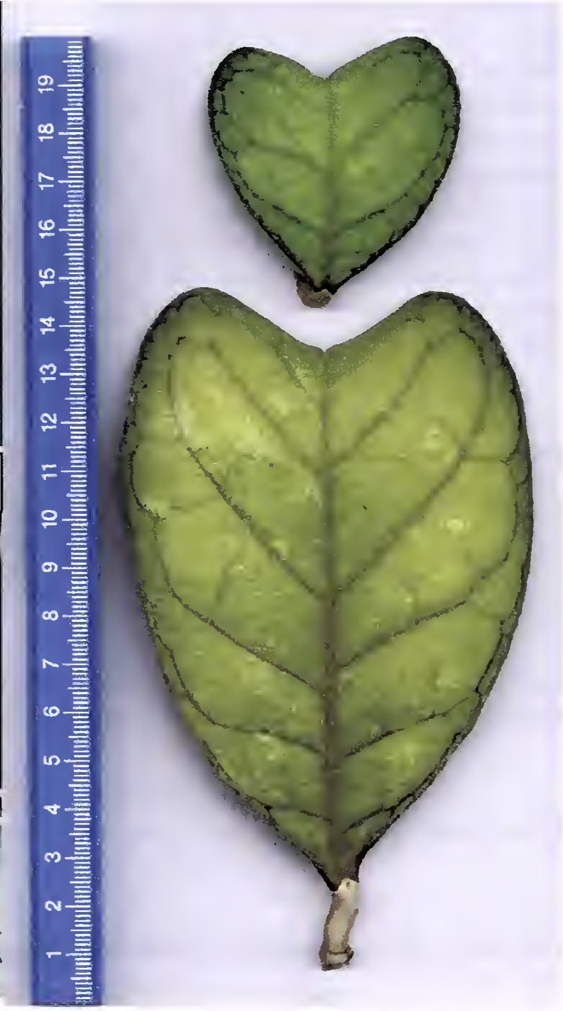
A tropical vine, rooting along the stems, bearing opposite, truncate to emarginate leaves with prominent green, pinnate venation, matte surface and sharp edge; persistent peduncles bearing hemispheric umbels of 15-30, buff-white, 1.5cm in diameter flowers. Follicles not seen. Sap, milky white. Fragrance pleasantly musky.

Leaf blade:	5 - 12cm long x 5 – 8cm wide x 2 –2.5mm thick, matte surface
Petiole:	3 – 6mm diameter x 10 -16mm long, rough surfaced, tan
Peduncle:	3mm diameter x 2cm long, at first flowering, tan
Pedicel:	1mm x 14mm, reddish, equal lengths
Calyx:	3mm in diameter, both sides glabrous with ciliate edges
Corolla:	15mm in diameter, glabrous outside, finely pubescent inside, buff-white
Corona:	5mm in diameter, obtuse outer lobe slightly above horizontal, white



Typical umbel





General growth

Typical leaves

Etymology: This unique and handsome leafed Hoya is named in honor of Mvr Deyke van Donkelaar of Werkendam, The Netherlands.

Conservation: From the original collection, living material is now in private and public collections all over the world.

Ted Green
Green: Plant Research
Kaaawa, Hawaii 96730 Web site:www.rare-hoyas.com

QUESTIONS AND ANSWERS ABOUT HOYAS

Q. I'm stumped by a lot of the initials connected to hoya species. Help me! M. Sweden.

A. Well, **IML** = Iris May Liddle. It is a prefix used by the Liddle's Nursery in Mereba, Australia. Their hoyas are numbered in order beginning with IML 1 and continuing on through the years as more species are acquired and collected.

IPPS = is a prefix used by Ruurd van Donkelaar (The Netherlands). It stands for Institute for Protection and Propagation of Succulent plants. Here again the numbers increase with time.

J.P. = Professor Juan Pancho, formerly head of the Botany Department at the University of the Philippines at Los Banos, Laguna, Philippines. Now retired. Has written several books on Philippine and world botanical subjects.

USDA = United States Department of Agriculture. Prefixes plants collected or catalogued by this department. Here again the numbers are in succession, some are hoyas, e.g. USDA 354237 etc.

MW = Maximo Wayet who now lives in Baguio, Luzon, Philippines. He collected a lot of species for Professor Juan Pancho and the University of the Philippines at Los Banos.

CT = Chanin Thorut, from Thailand, collector and grower.

CI = cinnamomifolia like, having leaves that remind one of that species.

DS = Davis Silverman, collector, also artist and sculpturer.

Phil-3 etc. = Species from the Philippines.

WMZ = Welch Mountain Zoo.

ABG = Adelaide Botanical Garden. (Australia)

SBG = Sydney Botanical Garden. (Australia)

DH = Dexter Heuschkel, director of the Manila Memorial Gardens. Developed a large botanical garden, paid for collectors to collect , mostly hoyas and begonias but other species too. Now retired. Distributed many of the species we now grow.

YM = York Meredith (Australian). Ted Green named a species for him collected in Borneo.

MM = Michael Miyashiro, Hawaii collector and breeder.

PNG & NG = (you might see it as P.N.G. or N. G.) From New Guinea

DL = David Liddle of Australia, prodigious collector and writer. See IML above.

N. T. = Northern Territory, the north central division of Australia including Darwin.

DMC = David Cummings, an Australian who has collected extensively, especially in the Philippines and Borneo. He now lives with his wife, Odette in South Africa.

PT = Peter Tsang, now deceased. An avid grower and collector who lived in Queensland, Australia. Contributed many hoya species to our collections.

BIRD TRACKS

From: Robin Director
Rosemary Peterson
6262 Kildee Street
Long Beach, CA 90808
(562) 425-4765
e-Mail: rsmary940@aol.com

Attention all IHA members! Did you take time to get involved in your association? Did you join a robin and meet nice people, exchange ideas, learn new things about hoyas, exchange cuttings, increase your collection and have fun doing it ? If not be brave and do so now ! Give a membership of IHA to a friend, a plant enthusiast, or a family member, maybe best of all a young person. ....Above all, enjoy life!

Robin #3. Debra, NV. My mother and aunt had cuttings of *Hoya carnosa* from my grandmother's plant from years ago. My aunt still has hers, not sure what happened to my mother's. I have had *Hoya krinkle*-8 and *Hindu rope, and Pink Silver* for many years. I had no idea how many hoyas were available, as I first started to order them from a Cactus and Succulent Nursery in California in the mid 80's. I only had 6 plants, then I found some ads along with information for IHA. Now I have close to 90 plants and more and more continue to bloom. I just ordered 11 more plants. I would have joined the Swedish Hoya Society, but unfortunately their journals are only published in Swedish. I have enjoyed their web site and pictures.

Robin #3. Harriette, CA.. I have managed to get up to date with the hoya index again. The next one will be published in the end of the year or the beginning of next issue. My *Hoya obovata* growing on one of the supports of the patio is in full bloom (Aug. 1999) and has to be seen to be believed. It drapes right across the opening of the patio.

Robin #3. Carita, Sweden. We had a wonderful summer this year (Sept. 1999) and we're still warm outside. I love the sunshine and so do my hoyas. They have grown quite well, some more than others. My *Hoya retusa* has become enormous in two years. I had some first time blooms this year, e.g. *Hoya solaniflora, Hoya chuniana, Hoya greenii, Hoya vitellina* and *Hoya cumingiana.* I love *H. solaniflora* and could not stand *H. cumingiana*'s sweet, heavy coconut ? fragrance. Yack, awful! The flowers are beautiful, but the smell...never again. Some others have bloomed too, *H. imperialis, H.archboldiana, H.* macgillivrayi, *H. wallichii, H. kanyakumariana* and different *H. potsii's* have bloomed as well as *H. longifolia, H. carnosa, H. compacta, and H. lacunosa.*

Robin #3. Anne, ID. I got a few cuttings from Dale and since I never seem to have any rooting compound I tried a few willow cuttings. I put the hoya cuttings in water with the willow for a couple of weeks and they had roots so I planted them. They seem to be doing better than the ones I started in potting media in the past. I read somewhere that willow gives off a rooting hormone. I've had some cuttings sit and sulk for several years before they decided to grow.

Robin #3. Rosemary, CA. I have my eye on a keen laptop, with built in camera, and can just see myself holding up a hoya to it to send you an email video of it!!! Wouldn't that be fun!! (Dec. 1999)

Happy New Year to everyone!!!
Write Rosemary and join the fun...

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How do you like the photos that are put into each issue of FRATERNA these days! Would you like to see more? We certainly would if w could afford it, but let's face it---one of the most expensive things about putting out an issue of FRATERNA is having all those pictures made and pasted into each issue. To offset those costs and allow more pictures to be added, we are actively asking our members to help sponsor a photo. This was very popular a couple of years ago, but in the last 18-24 months, we've seen a lack of interest ---probably because we didn't promote it enough. Let's rectify this! Send in your non-profit donation of $25.00-$50.00 $100.00 today! Through your generous support, everyone will benefit! Thank you.

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We now have the thirteen original issues of the Hoya Society-West Coast bulletin bound as one publication. The price of this bound text is $39.95 for U.S. shipment and out U.S. $48.95 shipped surface overseas. Due to the extra pages and pictures in our new publication "Fraterna", we must, out of necessity, increase our prices for back issues of "Fraterna" to $7.00 per issue, U.S. $9.00 per issue shipped surface mail overseas

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Includes all issues of Hoya Society West Coast Newsletters, beginning with issue #1, 1988 and International Hoya Association issues of Fraterna, Volume 1, #1 through Volume 12, #4, 1999

Bold faced type indicates photographs

Compiled by
Dr. Harriette Schapiro

Note: Any corrections to be made, and/or errors found should be forwarded to Dr. Schapiro at:

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5217 Cassandra Ln
San Diego, CA 92109

e-Mail: Schapir@mail.sdsu.edu

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FRATERNA

Volume 13 #2

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Hoya lambii Green
Photo by Ted Green

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Errors of fact may occur from time to time in "Fraterna". It is the policy of the IHA to publish corrections of fact, but will not comment on matters of opinion expressed in other publications.

Fraterna

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The President's Message

By Dr. Harriette Schapiro

Here it is, in March, and after six months of virtually no rain in San Diego, it has finally started to drizzle a bit. What this means is that I am temporarily off water duty. While I do love my plants in the back yard, I do look forward to the winter rains to take care of them for a while. Until a week ago, we had only had 0.47 inches (1.2 cm.) for the preceding 6 months. It's a good thing that our drinking water comes from the Colorado River and the Sierra snow pack. Despite all of the time it has taken to keep up with the yard plants, I have managed to get the IHA web site written.

We are now on line at http://www.international-hoya.org/ It is still a work in progress and will be modified over time. I felt it was more important to get on line than to "say it all" the first time around. The purpose of the IHA as I see it is clearly stated:

The purpose of the International Hoya Association is to serve and educate its members, and in so doing, provide an opportunity for the good fellowship and exchange of ideas which will stimulate interest and activity in connection with hoyas and other Asclepiadaceae. Members of The International Hoya Association may be beginners or may have advanced to the level of ongoing interest in the problems of speciation and identification of hoyas. The Association is dedicated to the inclusion of members with interest of every type and all levels.

While it is impossible to be the perfect organization for both the beginner and the professional, I would like to see the Fraterna and our web site be of interest to both extremes. The beginner needs basic information on culture conditions and problems while, in the Fraterna the more advanced reader can find the latest species novum description and technical articles on hoyas and allied species.

Starting with Volume 13, #1, a brief description of some of the content of the Fraterna will be in the web site. Exceptional photographs of hoyas will be added from time to time. I am certain that the information in the web site will alter with time.

Meanwhile, keep on growing!

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Our Cover Story

A new Sabah, Malaysia Hoya Species

A HOYA ADAPTATION – HOYA LAMBII Green

I have collected in Sabah, Malaysia, quite a few times in the past 10 years and there are only the far south-eastern and the far north-eastern corners that I haven't been to. On each trip, I am always looking for new hoyas and dischidias – and 2 old ones and some of the Philippine ones that I think should be there. I haven't found them so far. The 2 old ones are: **Dischidia complex**, Griffith, (syn *D. shelfordii*, Pearson), which is weird in that it has a double bullate leaf (a smaller one inside a larger one), which seems to be quite rare. And the hoya is something else-- quite rare--and I can't find it either.

In 1985, Tony Lamb of the Tenom Orchid Center, and Ben Wallace of the Sydney Botanical Garden, collected a hoya that has a weird adaptation: the large (4" x 6") elliptic leaves are clumped 2 at a node, and there are usually 1 or 2 other short, side branches at the same location on the stem, each with 2 more leaves, so that there might be up to 6 leaves at one point. The leaves are held upright at about a 30 degree angle and at a right angle to the lower set. Closely set, they make an efficient "basket" to direct water, trap debris and make a good home for ants.

In my garden I first found about this trapping when I attempted to clean out the debris that falls from the nearby pest trees. This debris causes trouble for it nearly always has seeds of the tree and they sprout and grow. I found that the debris was a solid mass of leaves, roots and ants.

The multiple, short stem, multiple leaf character is similar to **H. mitrata** Kerr- where the leaves are turned down and curved-in to make a "cabbage" that serves as an ant "hotel" and not to capture water or litter. **H. lambii** Green has leaves that are just the opposite with the leaves up and un-curved.

I have never seen an herbarium sheet or a written description that would give me hint of a given name of this handsome and odd hoya: therefore, I would like to name it **Hoya lambii**, after my friend Tony Lamb, Park Manager, of the Taman Pertanian Sabah at Tenom, Sabah, Malaysia.

HOYA LAMBII, Green sp. nov. Asclepiadaceae

Affinis *Hoyae mitrata,* Kerr, multiramis brevibus ad notos certos scundum caulem et ferenti unum par foliorum in quoque ramo sed foliis et flores differt.

Related to *Hoya mitrata* Kerr in having multiple, short branches at certain nodes along the stem and bearing a pair of leaves on each branch but differing in the leaves and flowers.

Holotype:	Bishop Museum, Ted Green No 9905 ex hort. Ted Green of Kaaawa, Hawaii. From Sabah, Eastern Malaysia, 85-1979

A tropical vine, rooting along the stems at the multiple, branching nodes; leaves opposite, elliptic with apiculate tips and prominent palmate venation, substance papery, with a matte surface; persistent peduncles bear globose umbels of 20-40, green, 1.8cm in diameter flowers. Follicles not seen. Sap, milky white. Fragrance pleasant.

This species has an odd adaptation of having multiple short stems at nodes along the stem which causes several sets of leaves to be bunched, thereby allowing an accumulation of debris, development of roots and a place for ants to build a nest.

Leaf blade:	Elliptic, 10-15cm long x 6-10cm wide x 1mm thick, matte surface, light green.
Leaf venation:	Palmate.
Petiole:	4-5mm diameter x 10 -15mm long, rough surfaced, tan and green.
Peduncle:	3mm diameter x 2cm long, at first flowering, greenish-tan.
Pedicel:	1mm x 3cm, green, equal length.
Calyx:	1mm x 3mm, cuneate.
Corolla:	1.8cm in diameter, glabrous outside and out, green.
Corona:	6mm in diameter, ovate outer lobe, flat across top.

I would like to re-collect this interesting plant so that there would be at least 2 clones in cultivation but where is it hiding? Probably just on the opposite side of the same tree trunk where I hid to get out of the rain!

Ted Green
Green: Plant Research
Kaaawa, Hawaii

HOYA AUCTION POSTS A RECORD

The March meeting of the San Diego Hoya Group held their annual plant auction. This is very popular among the members and this year proved to be the best auction ever. Over 55 items were up for auction----hoyas, dischidias, books, epiphyllums, cactus, bromeliads, even a television and a cake! One new member donated tickets to a play in San Diego, and also a pair of tickets to see the San Diego Padres!!

All in all, the club netted $617.00 from the auction, and 13 new members! This is a record for net proceeds, and a record for membership. The club membership is nearing 100 and still growing.

If you'd like to attend our next meeting (July 30th at Quail Gardens, Encinitas, California), contact Chuck Everson at (760) 758-4290 for details.

What in Blooming Daylights Causes Such Beauty?

by

P. V. Sencindiver

Why should Ted Green (Hawaii), Eva-Karin Wiberg (Sweden), and perhaps a few others be able to bloom so many hoyas year after year, month after month, with such ease, when so many of the rest of us are happy as jaybirds to bloom only a few easy ones intermittently? This question has bugged me for such a long time -- and still does! They each live in such diverse geographic and climate areas and conditions.

One thought has occurred to me regarding this dilemma. Each of these people enjoy a prolonged period of intense light, one because of proximity to the equator and one because of proximity to the Arctic Circle!!

Our planet and everything on it- from rocks to redwoods began as a dense, rolling cloud of hydrogen gas and dust. Scientists theorize that the shock wave from a nearby supernova - a dying star blowing matter in a huge explosion - big bang - compressed the cloud and seeded it with other elements that today make up our world. Solid particles formed where the cloud was densest, and gravity forced them together. Like an ice skater drawing in her arms as she spins, the cloud rotated faster as it contracted. Most of the particles drifted to the cloud's center, forming the future sun. In about a million years, the sun collapsed under its own gravity. The increased density made its center so hot that nuclear fusion began, and the first sunshine lit the still growing earth. With its appearance life had begun on earth. The early cells lived in the oceans and fed by absorbing organic matter. Then some found a better way. They began photosynthesizing, using energy of sunlight to make their food.

What does all of this have to do with Ted and Eva's good fortune? Intense sunlight - sunlight - sunlight over an extended period of time.

Pursuing the above thoughts, I have elected to look into the use of HID (high intensity discharge) light sources in an effort to duplicate the prolonged intense light environment created by nature in these two diverse situations.

I have long experimented with the use of fluorescent light sources to stimulate plant growth and, hopefully, bloom. (See previous article in Fraterna V. 12 #3). I am certain that the use of this light source does definitely facilitate and speed-up both sexual and asexual propagation of plant material (ie. seedlings and cuttings) but that it is of questionable value in the stimulation of bloom. I tend to thinly that it helps but just how much, I don't know.

Can artificial light from the high intensity discharge lamp family stimulate growth and blooming responses that are induced in plants by natural sunlight? HID's are incredibly bright. It is this brightness that probably makes them useful.

What constitutes the HID lamp family? What makes them most useful for indoor gardening? The metal halide and the high-pressure sodium lamps are probably the most efficient. These lamps come in various wattages. Mine are 1000 watts, more expensive than the 400-watt varied but probably render the best over-all efficiency. The metal halide bulb produces the white-blue light and the high-pressure sodium lamp's color spectrum is highest in the yellow and red end. These colors are what promote flower production.

My lights have large reflective hoods over them, the plant room has white walls and ceiling and in some areas reflective mylar is taped to surrounding walls. All of these amendments increase light intensity markedly. Additionally, my fluorescent light stands remain in place as described in the previous Fraterna article.

All lights burn the previously described 12 - 16 hours. It is expensive. Air circulation and venting are a must because of the heat generating capacity of the HID's. Watering and fertilizing needs are increased because of the increase in plant growth demand.

What have the results been? Over a nearly six month period the results have been rewarding, although expensive. Blooming has increased markedly; some hoyas that have never bloomed before for me have done so. For example, here on this New Jersey barrier island, today, December 14th, 1999 the following are in bloom: *H. carnosa, H. minibella variegata, H. carnosa variegata, H. acuta, H. kerrii, H. pubicalyx 'pinksilver', H. linearis, H. 'WeeBella', H. crassipes, H. carnosa cv.'Big one', H. carnosa motoskei, H. keysii, H. pubicalyx 'Big One', H. incrassata, H. coronaria, H. longifolia, H. pachyclada, H. nummularia, H. finlaysonii, H. pubicalyx 'pink silver' seedlings, H. coriacea, Stephanotis floribunda, Ceropegia cumingiana,* plus many different flowering vining and trailing gesneriad species.

These findings have been exciting for me. It has been the greatest hoya blooming experience I have ever had. Is the method worth the expense for the average hoya hobbyist? I don't know and leave that up to you. It does satisfy my curiosity for an answer to my question posed at the beginning of this article.

There remains much more to learn. What is the optimal length of time this intense light exposure should be in promoting bloom in hoyas? What is the ideal mix of blue-white halide and the yellow-red spectrum of high pressure sodium in the growth and blooming of these exotic plants? What are the effects on other plant material? My collection of vining and trailing gesneriads seem to have responded well in this study.

I would like to know what the experience of others among you might be. Let me hear from you.

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PLANT NUTRITION

It's All in the Chemistry

By David McRitchie
Toronto, Ontario, Canada

Most cacti and succulent hobbyists fertilize their plants during the growing season, whether on a regular or whenever 'I think of it' basis, and so they are familiar with the N-P-K ratio typically shown on the fertilizer container. However, many may not be familiar with the function of these nutrients and their contribution to plant growth.

Of course, N-P-K stands for Nitrogen, Phosphorous and Potassium which, along with Calcium, Sulfur and Magnesium are known as the macronutrients. The corresponding numbers indicate the percentage by weight of each as a part of the total fertilizer mixture. Often the fertilizer will also contain trace amounts of micronutrients such as Iron, Manganese, Zinc, Copper, Boron, Molybdenum and Chlorine. We'll examine all of these in order.,

Macronutrients

Nitrogen (N)

Nitrogen is found in soil in three major forms.
I) Elemental Nitrogen, which is an inert gas and as such is unavailable to plants.
2) Organic Nitrogen from decaying matter, again in an unusable form although soil organisms convert a portion of it to inorganic forms (ammonium and nitrate) which can be taken up by plants.
3) Inorganic Nitrogen applied as fertilizer. This is also generally found in three forms, ammonium, nitrate and urea. Although the latter is actually an organic form, with exposure to moist, aerated soil it rapidly converts to the ammonium form. In warm moist soils with a pH above 5.0, the ammonium form quickly converts to the nitrate form which is then readily assimilated by a plant. The ammonium form can also be utilized if present in the soil solution.

Nitrogen is present in all living cells and is an essential component of all proteins, enzymes and metabolic processes. It is a structural part of the chlorophyll responsible for photosynthesis which allows a plant to form necessary simple carbohydrates essential for growth. Nitrogen is therefore associated with stimulating rapid, vigorous growth.

Nitrogen can be leached from the soil by excessive moisture and, if the soil becomes depleted, must be replaced with the application of a suitable fertilizer. However, it must be noted that cacti and many other succulents present a somewhat unusual situation in that fertilizers with a high percentage of nitrogen (above 5% or so) can inflict considerable damage in that it causes the plant to produce soft, weak growth making it susceptible to infection by pests and disease.

Phosphorus (P)

Like nitrogen, phosphorus is an essential part of the photosynthesis process. It is normally absorbed by the roots from the soil solution in the form of phosphate ions. The soil solution is then replenished by soil minerals, organic matter decomposition or applied fertilizers.

In young plants, phosphorus is most abundant at the growing point and can be transferred from older tissue to younger tissue as needed (translocation). Phosphorus is involved in such plant processes as utilization of starch and sugar, cell nucleus formation, cell division and multiplication, fat and albumin formation, cell organization and transfer of heredity.

Potassium (K)

Potassium is absorbed by plants in larger amounts than any other mineral element except nitrogen and in some cases, calcium. It is supplied by soil minerals, organic materials and inorganic fertilizer. Potassium can be subject to leaching loss.

Potassium plays an important part in the metabolic processes of plants including several enzymatic reactions, particularly those involving the adenosine phosphates (ADP and ATP) which are the energy carriers in the metabolic processes of both plants and animals. It is essential in carbohydrate metabolism by which energy is obtained from sugar, as well as playing a role in photosynthesis by initiating the closure of stomata and in protein synthesis.

Calcium (Ca)

Calcium is supplied to plants by soil minerals, organic materials, fertilizers and liming materials.

An important part of cell wall structure, calcium provides for normal transport and retention of other elements as well as plant strength. It exists in delicate balance with manganese and potassium in the 9 plant. On oversupply of any one of the three can lead to a deficiency in the other two.

Sulfur (S)

In most soils sulfur is present as a result of the decomposition of organic matter and is taken up by plants primarily in the form of sulfate ions and then reduced and reformed into organic compounds.

Sulfur is a component of the amino acids cystine, cysteine and methionine and therefore of the proteins which contain these amino acids. It is found in vitamins, enzymes and coenzymes.

Magnesium (Mg)

Soil minerals, organic material, fertilizers, and dolomitic limestone are sources of magnesium for plants.

Magnesium is part of the chlorophyll in all green plants and essential for photosynthesis. It also helps activate many plant enzymes needed for growth. A relatively mobile element in the plant, can be readily translocated from older to younger plant parts in the event of a deficiency..

Micronutrients

Of the elements known to be essential for plant growth, seven are required in such small quantities that they are referred to as micronutrients.

Manganese (Mn)

Manganese may substitute for Mg by activating certain phosphate-transferring enzymes, which in turn affect many metabolic processes. High manganese concentration may induce iron deficiency in plants. Manganese availability is closely related to the degree of soil addity. Deficient plants are usually found on slightly add or alkaline soils.

Iron (Fe)

Iron is essential for the synthesis of chlorophyll, iron is a constituent of many organic compounds in plants. Iron deficiency is often induced by alkaline soil pH and can be induced by high levels of Mn. A high iron level can also cause manganese deficiency.

Copper (Cu)

Copper is essential for growth and activates many enzymes. A deficiency interferes with protein synthesis and causes a buildup of soluble N compounds. Excess quantities of copper may also induce iron deficiency.

Zinc (Zn)

Zinc is essential for plant growth because it controls the synthesis of indoleacetic acid, which dramatically regulates plant growth. Zinc is also active in many enzymatic reactions.

Boron (B)

Boron primarily regulates the metabolism of carbohydrates in plants. Boron deficiency may occur in both alkaline and add soils but is more prevalent in calcareous, alkaline soils.

Molybdenum (Mo)

Molybdenum functions largely in the enzyme systems of nitrogen fixation and nitrate reduction. Plants which can neither fix nitrogen nor incorporate nitrate into their metabolic system because of inadequate molybdenum become nitrogen deficient. Molybdenum is required in minute amounts.

Chlorine (Cl)

Chlorine is needed in relatively large quantities in plant nutrition. However, the abundance of chlorine from many sources in the environment means that deficiencies in plants are rare.

Specialty Fertilizers

Fertilizers compounded especially for cacti and succulents have low N-P-K values. For example, the container of a popular brand, *Cactus* Juice by the Security Products Co. of Phoenix, Arizona indicates values of 1-7-6 respectively. In addition, small amounts of the micronutrients calcium (1.0 %) and chlorine (4.5%) are also shown.

There are two main reasons for low values in this product. The first, of course, is to avoid a buildup to toxic levels of any components. The second reason is more complicated and requires some explanation.

In nature, water tends to flow spontaneously towards regions of lower energy, that is, downhill. This tendency is controlled by three effects:

I. Gravity - effect is almost negligible.

2. Water under pressure (called hydrostatic pressure) tends to move toward lower pressures.

3. This is particularly important in regard to succulent plants—water flows from regions of low salt or solute concentration to regions of higher concentration. This process, as you may know, is called osmosis.

Succulents, by definition, are able to store large volumes of water and therefore do not absorb the quantities in any given time of non-succulent plants. As cacti lose moisture, mainly at night through the stomata, a negative hydrostatic pressure is induced in the plant which, under effect number two above, causes soil moisture, which is under a less negative or perhaps positive hydrostatic pressure, to be taken up by the roots. In order to pass into the roots, the soil moisture must overcome only the slight tendency of the solutes in the root moisture to move water in the opposite direction by osmosis.

However, it is possible, if an application of fertilizer with high N-P-K values is applied to the soil, the low solute concentration in the roots combined with a high concentration in the soil moisture will create a osmotic pressure in the opposite direction which may be great enough to overcome the hydrostatic pressure described above and cause a migration of moisture from the roots to the soil.

Clearly then, fertilizers with low nutrient values are to be preferred. The commercial brands intended specifically for cacti, while no doubt excellent, tend to be expensive. A more frugal route to follow is to use a dilute solution of the water soluble mixtures available at all garden centers. For example, a 20-20-20 fertilizer mixed at 1/4 the strength recommended in the manufacturer's directions gives a 5-5-5 solution—quite suitable for our purposes.

References:

Fact Sheet *SL-8,* Soil and Water Science Department, Florida Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida.
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The following article was published by the authors in Asklepios 78 (1999). it is reproduced here by permission of the authors and Asklepios. It will be presented in 3 parts.

THE GENUS *HOYA* R.BR (ASCLEPIADACEAE: MARSDENIEAE) AS COMMONLY CULTIVATED IN AUSTRALIA

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Summary: A concise descriptive account of 37 species of *Hoya* (Asclepiadaceae: Marsdenieae) as encountered in common cultivation in Australia is presented together with an identification key and tentative treatment of cultivars.

Introduction

The genus *Hoya* R.Br. comprises in excess of 300 species (Forster unpubl.); however, only about 200 are in cultivation and less than 40 could be considered as being in general garden circulation. It is unlikely that a modern monograph of the genus will be arrived at for some time and the best that can be hoped for in the interim are regional accounts of species and the description of further novelties. Apart from a number of regional taxonomic treatments (e.g. Rintz 1978; Kloppenburg 1991; Forster & Liddle 1996) the only available text specifically on *Hoya is* that of Kloppenburg & Wayman (1992) which presents numerous colour photos and a range of information. An overview of diversity in the genus has been recently published and should be referred to for a relatively detailed list of literature (Forster *et al.* 1998). As well there are two magazines devoted to the genus, 'The Hoyan' published by the Hoya Society International' and 'Fraterna' published by the International Hoya Society. Both of these magazines have articles on all aspects of the study of *Hoya* from the description of novelties to the basics of cultivation. There are innumerable articles by C.M.Burton in 'The Hoyan' concerning the 'correct' identity of many of the commonly cultivated Hoyas and those readers with more than a passing interest in such matters should refer to these.

We are constantly questioned by cultivators of Hoyas for accurate identification of plants in common cultivation. There are less than 40 commonly cultivated Hoyas in Australia, and by common we mean those that are met with in the nursery trade, garden clubs, plant swaps etc. From perusal of nursery catalogues and the two *Hoya* journals 'The Hoyan' and 'Fraterna' it is evident that this same group of taxa is also commonly cultivated in Europe and the U.S.A. These so-called common species come from throughout the range of the genus in Asia, Malesia, Melanesia and Australia, hence there is limited success in referring to the few regional treatments already cited to attempt identification.

At present Roger Spencer at the Royal Botanic Gardens, Melbourne in Australia is preparing a four volume 'Horticultural Flora of South-east Australia', much along the lines of 'The European Garden Flora'. A concise descriptive account of *Hoya* by the authors has been produced for the forthcoming Vol. 3 of this publication and will probably appear sometime in 2000. We have rearranged and expanded this account for the current paper and encourage **constructive** comment and feedback in this journal or elsewhere on the species covered and also the characters chosen to distinguish them.

One of the major problems with the taxonomy of *Hoya is* that many of the species are quite poorly known, both in terms of the herbarium record and live collections with data. A majority of cultivated species either have no data or are known by one or few collections with locality information. In the 1980's and 1990's we attempted to introduce to cultivation numerous clones with data from Australia, Papua New Guinea and the Solomon Islands. Other notable contributors of collections with data include Ted Green of Hawaii, Dale Kloppenburg of California and Ruurd van Donkelaar of The Netherlands. There is now more material of *Hoya* in cultivation with data than ever before, but there is still a long way to go before the majority of species are represented. To further frustrate enthusiasts of this genus, some species originating from tropical regions (e.g. much of New Guinea) are intolerant of cold or will not flower in temperate and subtropical climates. This is a great pity as species such as *H. anulata* (Figure 4), *H. archboldiana* (Figure *2), H. ciliata* (Figure 5), H. *gigas* (Figure 10), *H. imperialis* (Figure 11), *H. purpurea* (Figure 19), *H. subcalva* (Figure 20) and H. *sussuela* (Figure 22) are truly spectacular in full flower.

Species of *Hoya* are variable, especially if one looks at a lot of clones from throughout a species range. With H. *australis (Figure* 3) the decision was made to recognize five subspecies with similar floral morphology and dissimilar vegetative morphology (Forster & Liddle 1991). This decision was based on extensive fieldwork and a large number of clones with data that were grown under uniform conditions to ascertain phenotypic and genotypic patterns of variation. To date no-one has repeated this exercise with any other species or species group of *Hoya* and many species are known in cultivation by a single or few clones.

Students of *Hoya* often ask "what makes a *Hoya?".* While a combination of characters go together to define the genus, the single best defining character is the presence of five staminal coronal lobes attached to the staminal column between the anthers and that appear to be inrolled on the outer edge. Genera that are closely allied to *Hoya* include *Dischidia* R.Br., *Madangia* P..I. Forster, D.J. Liddle & I.M. Liddle and the ill-defined *Marsdenia* R.Br.; however, a satisfactory phylogeny for this area of Marsdenieae has yet to be derived.

With regard to the following account it should be noted that most of the taxa are known in cultivation from one or less than five clones. Our account is based almost wholly on live material cultivated at the Liddle's nursery hence the described variation will be less than for the species as a whole. The descriptions are intended to be complimentary (either with or without a character state), and the key requires a flowering plant. Suggestions for recognition are intended to work only for this group of species. Our treatment of cultivar names (and synonymy thereof) is tentative and we have generally not attempted to cross-reference to the listing of Clark (1996a, b).

Many species have indumentum on young foliage that is lost on maturity, and description of foliage indumentum is for adult leaves. Inflorescence arrangement is as defined by Rintz (1978). Flower number in an inflorescence is approximate. Corolla diameter is for non-flattened fresh flowers. Corolla lobe position is in relation to the central part of the flower and not to the centre of the lobe. Only names that are common in the Australian nursery/garden trade are listed as synonyms. Bibliographic information is not included and can be ascertained from 'Index Kewensis'. The species are arranged alphabetically and a selection are illustrated.

Hoya R. Br.

Epiphytic or lithophytic twiners or subshrubs with clear or white latex, stems hirsute or glabrous. Leaves well-developed; colleters present. Corolla campanulate or rotate, glabrous or with short generally papillose trichomes; tube usually short; lobes usually free at tips, valvate. Annular, corolline and interstaminal coronas absent; staminal corona of 5 lobes with inrolled keels. Follicles fusiform. Seeds comose at micropylar end.

Key to species of *Hoya* commonly cultivated in Australia

1a. Plants non-twining subshrubs, erect or trailing 2
1b. Plants twining vines, often trailing 8
2a. Plants erect 3
2b. Plants trailing 5
3a. Corolla *white* .... *H. odorata*
3b. Corolla yellow 4
4a. Corolla 18-20 mm diameter .... *H. multiflora*
4b. Corolla ~7 mm diameter .... *H. cumingiana*
5a. Corolla ~7 mm diameter .... *H. linearis*
5b. Corolla 12-18 mm diameter 6
6a. Corolla pale green .... *H. serpens*
6b. Corolla cream to white 7
7a. Leaves thin-fleshy .... *H. lanceolata*
7b. Leaves thick-succulent .... *H. bella*
8a. Leaf margin corrugate .... *H. caudata*
8b. Leaf margin entire 9
9a. Corolla greater than 5 cm diameter 10
9b. Corolla less than 5 cm diameter 11
10a. Leaves glabrous; corolla maroon to red-purple .... *H. macgillivrayi*
10b. Adult leaves velutinous hairy; corolla white .... *H. magnifica*
11a. Inflorescence a positively geotropic concave umber 12
11b. Inflorescence a positive or negative convex umbel 18
12a. Corolla less than 4 mm diameter .... *H. bilobata*
12b. Corolla more than 4 mm diameter 13

13a. Leaf lamina venation prominent with the lateral veins a different colour to the rest of the leaf .... *H. obscura*
13b. Leaf lamina venation obscure or barely visible **14**
14a. Corolla red; corona red-yellow .... *H. tsangii*
14b. Corolla cream, yellow to apricot, pink-white; corona cream, yellow to apricot, pink **15**
15a. Corolla cream; corona cream .... H. *lacunosa*
15b. Corolla yellow to apricot or pink-white; corona yellow to apricot, or pink-white **16**
16a. Adult leaves glabrous .... *H. micrantha*
16b. Adult leaves with soft velutinous indumentum **17**
17a. Corolla pink-white; corona pink-white .... *H. nummularioides*
17b. Corolla yellow to apricot; corona yellow to apricot .... *H. parvifolia*
18a. Leaf lamina noticeably palminerved with 3-7 nerves from the base **19**
18b. Leaf lamina penninerved or with venation obscure **23**
19a. Leaf lamina 7-nerved from base .... *H. samoensis*
19b. Leaf lamina 3-5-nerved from base **20**
20a. Leaf lamina 3-nerved from base **21**
20b. Leaf lamina 5-nerved from base **22**
21a. Leaf lamina venation obscure or weakly developed; corolla lobes c. 5 mm long, 3-3.5 mm wide .... *H. acuta*
21b. Leaf lamina venation prominent; corolla lobes 6-7 mm, 4.5-6 mm wide .... *H. pottsii*
22a. Corolla lobes noticeably papillose hairy; corona purple-red .... *H. cinnamomifolia*
22b. Corolla lobes glabrous; corona cream .... *H. subquintuplinervis*
23a. Leaves with irregular silver flecking in lamina **24**
23b. Leaves without irregular silver flecking in lamina **26**
24a. Corolla pink-purple .... *H. pubicalyx*
24b. Corolla white to pale pink **25**
25a. Latex clear; leaf lamina with 8 or 9 lateral veins .... H. *motoskei*
25b. Latex white; leaf lamina with S or 6 lateral veins .... H. *obovata*
26a. Latex clear **27**
26b. Latex white **28**
27a. Corolla 13-18 mm diameter; lobes 4-5 mm wide .... H. *compacta*
27b. Corolla IS-18 mm diameter; lobes 5-5.5 mm wide .... H. *carnosa*
28a. Corolla with patch of red under corona .... H. *australis*
28b. Corolla otherwise **29**
29a. Leaf lamina with a pronounced apical notch; corolla 7 - mm diameter .... H. *kerrii*
29b. Leaf lamina without a pronounced apical notch; corolla 10-20 mm diameter **30**
30a. Leaves velutinous *hairy* .... *H .globulosa*
30b. Leaves glabrescent **31**
31a. Leaf lamina greater than 5 times long as wide **32**
31b. Leaf lamina less than 5 times long as wide **34**
32a. Corona red .... *H. pauciflora*
32b. Corona white **33**
33a. Leaf lamina incurved with age; corolla 18-20 mm diameter, lobes noticeably papillose only on edges .... *H. shepherdii*
33b. Leaf lamina remaining ± flat with age; corolla 16-17 mm diameter, lobes noticeably shaggy papillose all over .... *H. longifolia*
34a. Leaf lamina with lateral venation obscure .... *H. diversifolia*
34b. Leaf lamina with lateral venation discernible **35**

35a. Leaf lamina with less than 5 lateral veins ………………………………………………*H. flavida*
35b. Leaf lamina with greater than 7 lateral veins ……………………………………………36
36a. Corolla 9-10 mm diameter, pale pink……………………………………………………*H. fraterna*
36b. Corolla 11 - 13 mm diameter, yellow ………………………………………………*H. polyneura*

Plate 1: Captions to Colour Illustrations.
Figure 1. *Hoya acuta,* IML97. Photo: D.J. Liddle.
Figure *2.* *Hoya archboldiana,* IMU14. Photo: D.J. Liddle.
Figure 3. *Hoya australis subsp. australis,* IML599. Photo: D.J. Liddle.
Figure 4. *Hoya anulata,* IML196. Photo: D.J. Liddle.
Figure 5. *Hoya ciliata,* IML390. Photo: D.J. Liddle.
Figure 6. *Hoya compacta.* Photo: G.A. Hedgecock.
Figure 7. *Hoya cumingiana,* IML 168. Photo: D.J. Liddle.
Figure 8. *Hoya pavida,* IML499. Photo: D.J. Liddle.
Figure 9. *Hoya carnosa,* IML43. Photo: D.J. Liddle.
Figure 10. *Hoya gigas,* Garassa. Papua New Guinea. The largest flowered species. Photo: M. Clements.
Figure I 1. *Hoya imperialis,* IML222. Photo: D.J. Liddle.
Figure 12. *Hoya lacunosa.* Photo: G.A. Hedgecock.

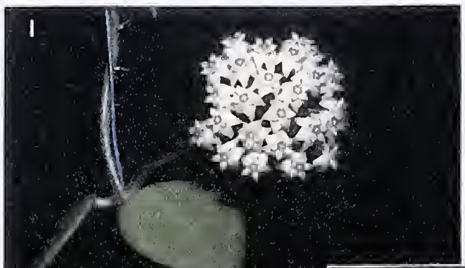
Editors Note: **This article continues on page 15 with a full page of color photos.**

Additional Note: This continuation of P.I. Forster's (et al) article will continue in the next issue of Fraterna, with part 2. At this time I wish to thank Mr. Forster for allowing us to reprint this wonderful article, which originally appeared in a British journal entitled 'Asklepios' -- and published by the International Asclepiad Society.

For those of you interested in becoming a member of this fine organization, contact Sue Haffner at: 3015 Timmy St., Fresno, CA 93612

Ed.

See next page for color photos accompanying this article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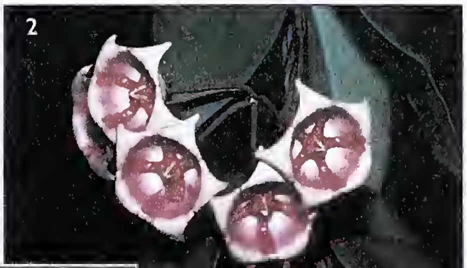
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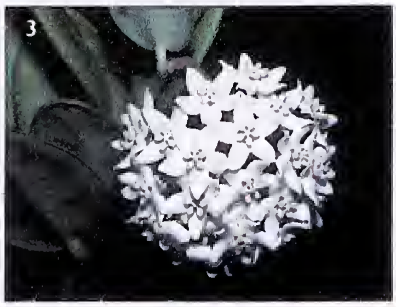
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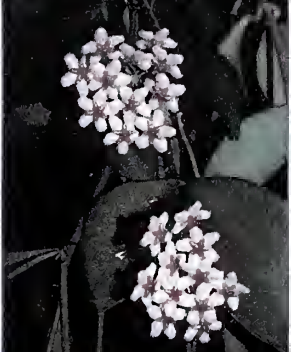
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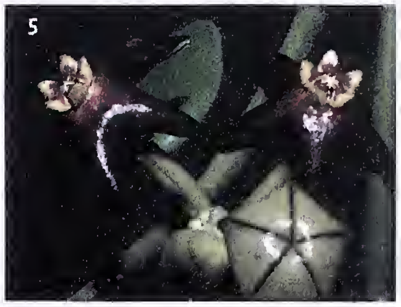
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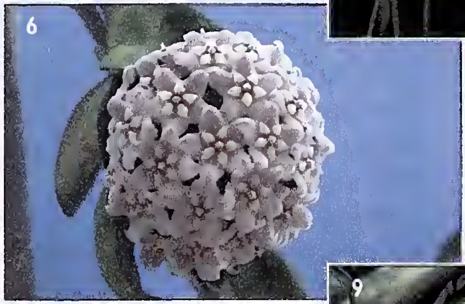
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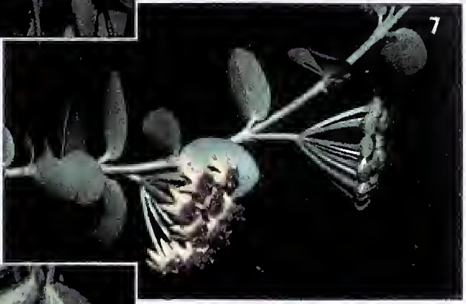
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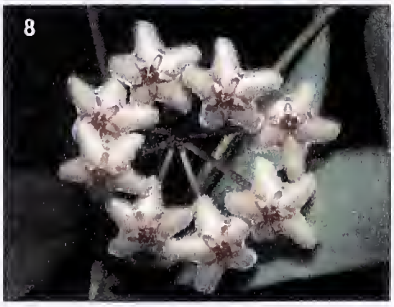
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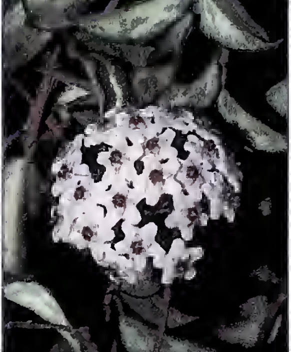
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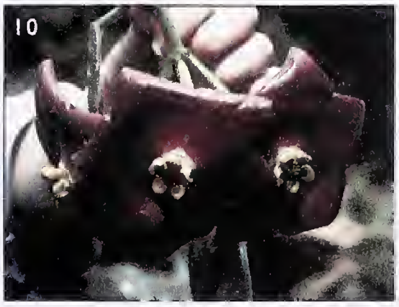
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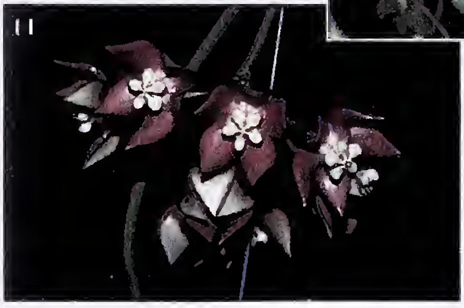
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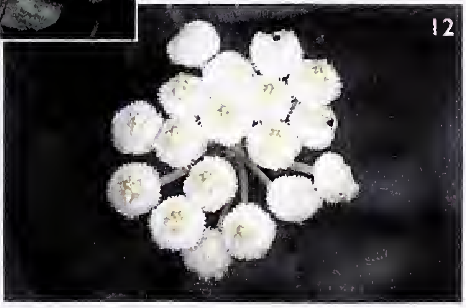
12

Q & A

Questions and Answers about HOYAS

Q. Give me some ideas of labels for my hoya plants. MF.

A. Most of these I picked off the internet of the hoya collectors group. If you look for a nursery supply company you may find several types of plastic labels, some from sheets of tear off labels, others individual pointed labels and in different colors. Here are some other ideas: use chopsticks, long enough to rise above the foliage and thus easy to read. The different colors can be used to designate various subgroups. Also try Popsicle sticks, metal and plastic mini-blind parts. Find them at junk yards or at yard sales. They can be cut to the desired length with scissors. On labels use a soft pencil or a permanent ink marker or both. You can also cover the writing with clear fingernail polish of spray plastic, etc.. With a permanent ink marker you can also label the pot itself and when re-used, scrape off.

Q. What do you think should be put on the plant label. CP.

A. The species name, and all other known data that room provides for. Your source, the date acquired. The dates it flowers, how many flowers in a umbel, the length they stay open. Well what about the fragrance and when it is most pronounced ? Facts you note while caring for the plant. On and on, you can not have too much information. What won't go on a label might be kept in a special hoya notebook.

Q. Give us some sources of hoyas on the world wide web, www.

A. Well there are more and more every day as the interest in hoyas continue to expand worldwide. Here are some: www.

international-hoya.org
home2.swipnet.se/~w-21721/hoya.htm.
egroups.com/list/hoyafreaks
egroups.com/hoyacollectors
aol.com/gwynedd/gwyn/grow.htm
http://hem3.passagen.se/clunbhoya
cactus-mall.com/rainbow_bookshop
rare-hoyas.com
bobsmoleys.com
ag.usask.ca/cofa/departments/hort/hortinfo/plants/hoya.html
graylab.ac.uk/usr/hodkiss/hoya2.html
eurekanet.cam/~plants/f_99list.html
dir.yahoo.com/Science/Biology/Plants/Hoya
(on the above try the prefix ca.;dir.;au.;sg.)
agri.gov.ns.ca/pt/hort/garden97/gg97-54.html

Q. I have a lot of hoyas, but very few flower. They look big and lush, but no blooms. Why? CE

A. You're not giving them enough light. More light, more blooms. If that doesn't work, get back to me.

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How do you like the photos that are put into each issue of FRATERNA these days! Would you like to see more? We certainly would if we could afford it, but let's face it---one of the most expensive things about putting out an issue of FRATERNA is having all those pictures made and pasted into each issue. To offset those costs and allow more pictures to be added, we are actively asking our members to help sponsor a photo. This was very popular a couple of years ago, but in the last 18-24 months, we've seen a lack of interest ---probably because we didn't promote it enough. Let's rectify this! Send in your non-profit donation of $25.00-$50.00-$100.00 today! Through your generous support, everyone will benefit! Thank you.

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We now have the thirteen original issues of the Hoya Society-West Coast bulletin bound as one publication. The price of this bound text is $39.95 for U.S. shipment and out U.S. $48.95 shipped surface overseas. Due to the extra pages and pictures in our new publication "Fraterna", we must, out of necessity, increase our prices for back issues of "Fraterna" to $7.00 per issue, U.S. $9.00 per issue shipped surface mail overseas

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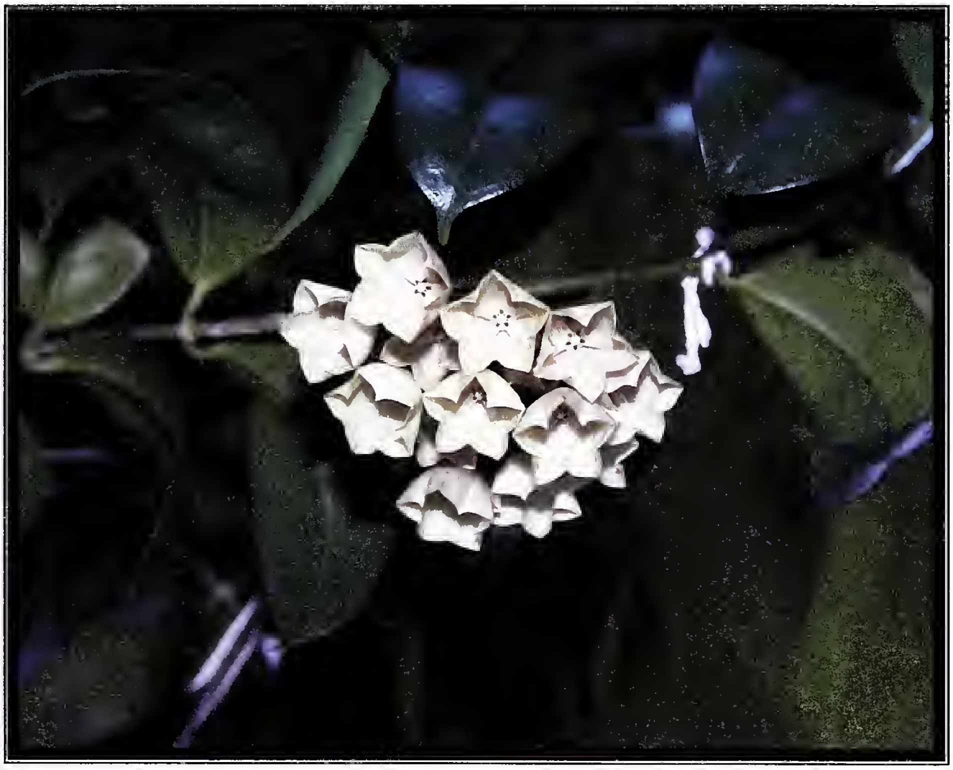
FRATERNA

Volume 13 #3

Official Bulletin For The
INTERNATIONAL HOYA ASSOCIATION

July-Sept.
2000



Hoya sp. affinis cystiantha
Photo by Edward Gilding

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Errors of fact may occur from time to time in "Fraterna". It is the policy of the IHA to publish corrections of fact, but will not comment on matters of opinion expressed in other publications.

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The President's Message

By Dr. Harriette Schapiro

Let's celebrate the new Millennium with a voter registration drive. The International Hoya Association Board of Directors has committed to obtaining 100 new members for the year 2000. That's right---100 new members! It **IS** possible!

How do we accomplish this?

1. Rainbow Gardens Bookshop has volunteered to notify all of their mailorder customers about the benefits of being an IHA member by inserting a special leaflet of IHA information in their next catalog mailing.

2. The IHA website is already a qualified success, but it will be even better with expanded information about the quarterly issues of Fraterna, with more photos, and more information about hoyas. This should bring in new members.

3. I have instructed the advertising Chairperson to look for a place where we can advertise the benefits of being an IHA member. This will most certainly add more members to our society.

4. Now I ask each and every one of you to tell your friends and relatives about the joy of growing and caring for hoyas by becoming a member of the IHA and receiving our beautiful and informative quarterly issues of Fraterna.

As always, we need **YOUR** input. Those of you that grow hoyas under lights and indoors in your homes, tell us about it. If you feel that you can't write a good enough article for Fraterna, either our editor, Dale Kloppenburg or I will be glad to help you edit it and get it ready for publication. Join a Round Robin. Write to Rosemary Peterson and get to know people who grow hoyas elsewhere. It's a great opportunity to make new friends. If you have a question on growing and culture of hoyas write a note to the Editor. Dale is always looking for good questions for the Q and A column.

Dr. Harriette Schapiro
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(858)273-4267
Email: schapir@mail.sdsu.edu

Hoya sp. affinis cystiantha

By Edward Gilding

HOYA INLAWS.

As many growers of hoya species will notice after they have accumulated their first half-dozen species, hoyas are diverse. Sooner or later one realizes that some of these plants are so different that maybe some aren't even hoyas at all. I will save that can of worms for a later date when I can make a case of it but for now I just want to explain the title I have chosen. The plant that this article is about is closely related to a specie that has its' status in the genus in question, that species is known as *H. campanulata* or *Physostelma wallichii*. The plants are placed together simply because they are both vining members of the same family from the same continental neighborhood. Why is there a multitude of genera for allied orchids but other plants are lumped together? Maybe it is because hoya is such a convenient four-letter word (among others!) or maybe it is because they haven't inspired the same romance or financial draw as orchids where authors wished to name genera and species after their patrons.

On to the subject of *H. cystiantha*, and how it made its' tortuous journey into my collection. *H. cystiantha* was first published as *Cystidanthus laurifolium* by Blume in 1849. Later it was called by various names such as *Physostelma laurifolium* among others in some trail of names in which I do not have all the information. Named finally as *H. cystiantha* by Schlechter, the species was poorly described and thus the concept of the specie is vague at best. Because of this I feel it would be pointless and ridiculous to call this plant by any name with any confidence without first having an unambiguous description. Why argue for a name if the descriptions attached are incomplete or dare I say it, wrong.

In the case of *H. cystiantha* Schlechter, the entire plant as described, is close to that of *H. campanulata* with flowers half the size and pale brown. Absolutely no details of the corona are given, badly crippling the description.

In April 1999, I was very lucky to be able to go on a trip to Sumatra and West Malaysia. It was one of the most productive and exciting collection trips I have ever been on. Ted Green, Torill Nyhuus, Eva-KarinWiberg, Monette Gilding and I spent just four short days on Sumatra. In that time the species resembling *H. cystianthus*, *H. lasiantha*, and an attractive Eriostemma section Hoya were found along Sungei Alas in southern Aceh. The altitude was about 2200 feet but the river cooled the surrounding air allowing for a comfortable stay in a cabin near the river. We were walking to the river when I passed a little sapling. I was wondering what kind of tree it was and noticed that it had the usual medium green leaves with the drip-tip and algae growing on the leaf surface. The sapling had alternate foliage, but oddly, I noticed a twig with opposite leaves growing from the top of the sapling. I looked closer and sure enough it was a twining plant that stopped twining and grew a stiff bushy shoot. So much like the *H. campanulata* I had in my collection, I immediately picked off a leaf to look at the sap. It was milky. This is **something**, I thought to myself. I traced the vine to the forest floor where it rooted in the leaf litter and the stem ran along the ground for some length only to peek above the leaf litter with a bushy growth or to twine up and over another sapling. We found three similar vines that day.

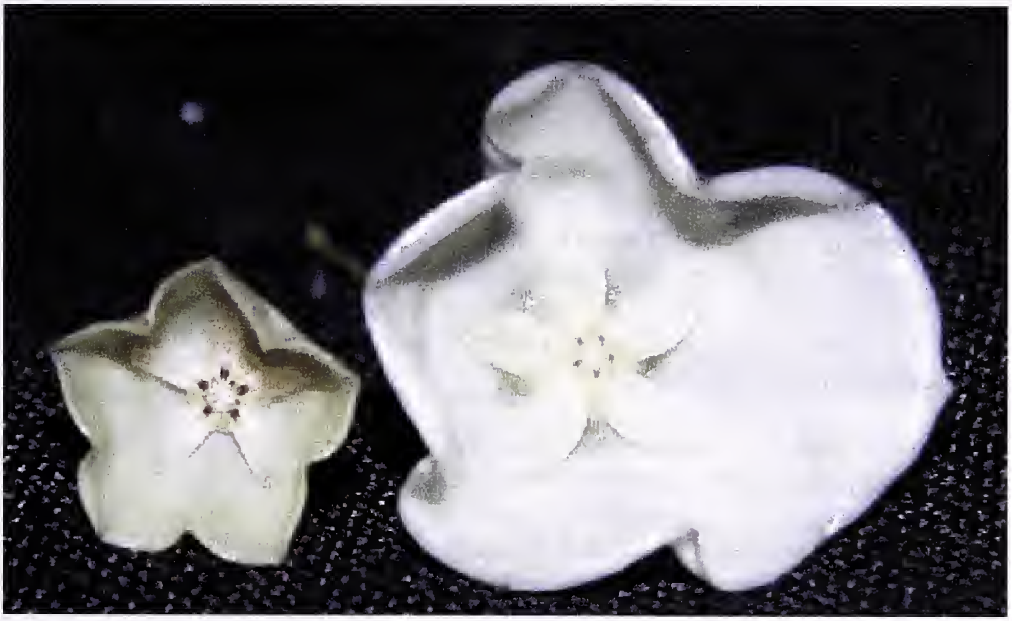
Back in town, I packed the cuttings with moist New Zealand sphagnum moss wrapped around the stem. I then put those moss-wrapped ends into a plastic bag, sealed them in a box and mailed them home on April 6, 1999. In that parcel lay cuttings of an odd Eriostemma, *H. caudata*, and the cuttings that would later prove to be *H. lasiantha* and *H. sp. aff. cystiantha.* After three weeks I assumed the parcel was lost, confiscated or destroyed somehow. Then just as I was leaving for my second job, the mailman pulled up with a flattened box that had stamps from God knows where on it. It was almost a cliché-- the "parcel that went around the world and now somehow, found its destination". I unpacked the nearly dead cuttings to find a few that hung on to their leaves. After further unpacking, the cuttings with leaves actually made excellent root growth.

H. sp. aff. Cystiantha was one of those cuttings and it recovered quickly, growing into a bushy plant with an uncanny resemblance to the *H. campanulata* in my collection. However when placed side by side, a difference is noticed in the older leaves as they curl under along their width and the venation is reticulated on the upper surface. The flowers are much more numerous ranging from twenty-four or more flowers with a fully expanded diameter of 1cm. The flowers have a thicker texture and a creamy ochre color. They are charming jewels that last for just over a week and smell of lemon grass at night. The corona has thinner filaments that curve upwards and seem to match some of the drawings of *H. campanulata* better than the larger flowered plant we now have known under that name. Go figure.

Let the bickering begin. (END)

Additional background information:

Hoya cystiantha Schlechter



A digital photo by Edward Gilding sent to the Editor over the internet by E-mail, April 2000. The large flower to the right is of *Hoya campanulata* Blume.

Photo sponsored by: San Diego Hoya Group Member
(Anonymous)

Hoya cystiantha Schlechter

As Ed Gilding said, *Hoya cystiantha* and its co-species *Hoya campanulata* have had a tortuous journey into the present. In the early days many present day hoya species were first placed in genera like Physostelma, Cystidianthus and others. Eventually these species found their way into the genus Hoya and the genera became sections under hoya.

Dr. Blume in 1826 described *Hoya campanulata* in a very short description, placing it in a section Acanthostemma (which he did not describe) saying the exterior angle of the coronal lobe was emarginate. This perfectly fits the species recently collected in Sumatra, in addition to the emarginate apex the species follows the other Section Acanthostemma hoya species in having spatulate inner coronal lobes.

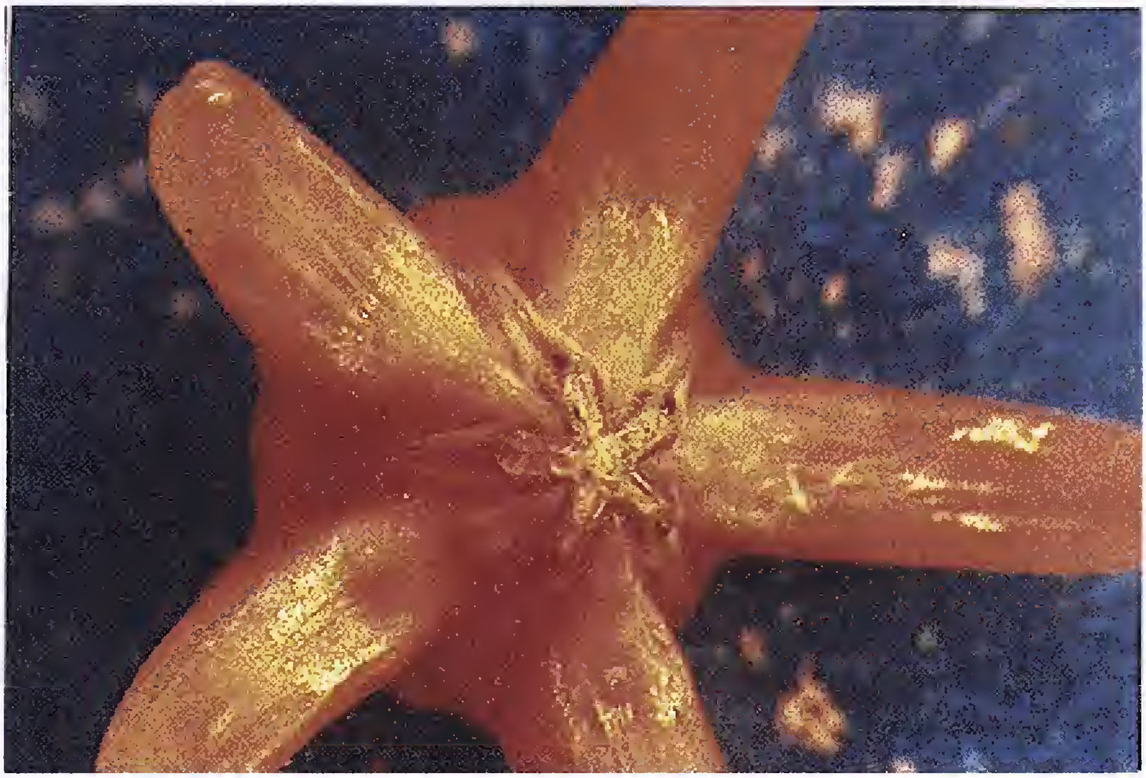
Now for our new found friend---is it Dr. Schlechter's *Hoya cystiantha* . Or was it correct when originally named *Cystidiantus laurifolius* Blume ? Schlechter says (1913) " *H. campanulata* Decne exists on the Malayan peninsula and on Java, and *H. cystiantha* Schlechter (*Cystidianthus laurifolius* Blume) is from Sumatra". Schlechter made no description nor did he refer to a type species. The first description of Cystidianthus was by H. Zollinger and F. Miquel in Flora of India Bataviae 2 (1856) 516 "leaves at bases generally acuta obverse, oblong or lanceolate acuminate, leathery 3-4.5" long, flowers mid-sized; it is very similar to.... *H. campanulata* but 1/2 smaller, lobes erect triangular-ovate acute, Sumatra".

You can't find out much from that description, nor is any type sheet mentioned. Various others since then have placed the species in the (then) genus Physostelma. At least now we recognize this as a hoya and it is about 1/2 the size of *H. campanulata* also with emarginate apex and spatulate inner coronal lobes. (see the picture of the corona and pollinarium). The outer coronal lobes of this species extends a short distance up the cupped surface of the corolla and Ed tells me it touches this surface (it is not raised on a column above the surface). The pollinaria of both of these species are beautiful and distinct.

It would appear from the literature that there are 3 species involved here, so all hoya hunters keep on collecting and maybe eventually we will scratch the surface.

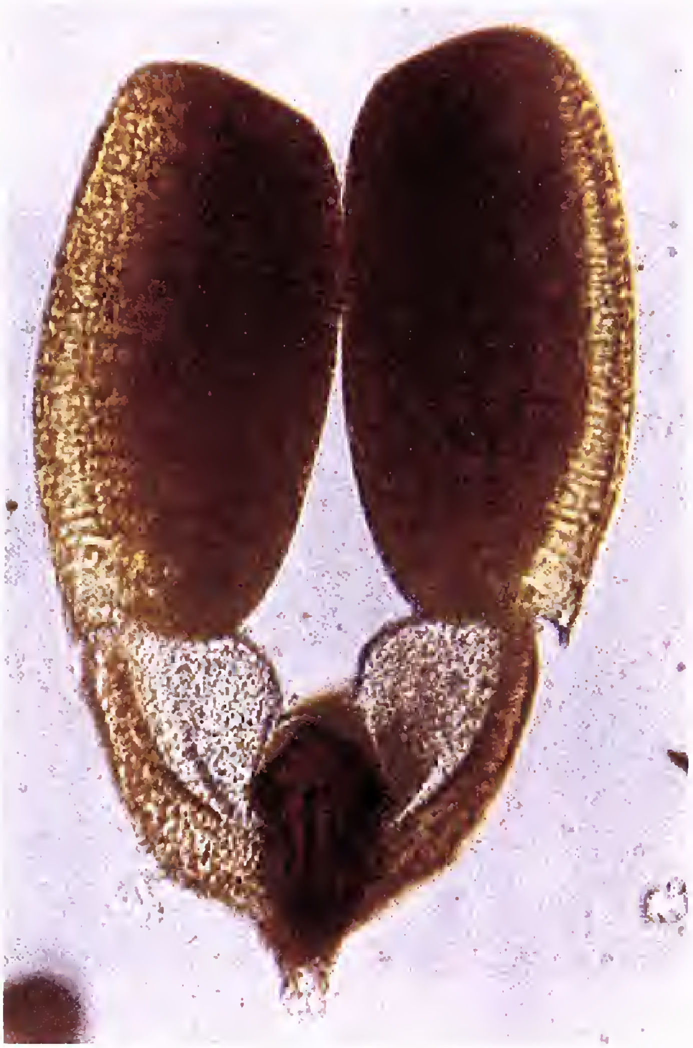
I believe it will take advances in DNA technology to resolve many of these issues. We need the ability to extract DNA from dried Type herbarium sheets and the access to these sheets to do so.

Editor.



Top view of the corona of *Hoya cystiantha Schlechter* ? enlarged about 16X. This is a large corona, the lobes are narrow and long, bifid at the outer apex. The upper surface is striate the inner lobe appears to be dentate, nearly all bilobed species have spatulate inner lobes. These inner lobes do not reach the center so the anthers are well exposed. The crown has considerable depth in the central portion.

Photo sponsored by; Jeff Stagg



Pollinarium enlarged approximately 165X, This is a beautiful structure, very distinctive. I am of the opinion that nearly every species could be delineated by its pollinarium characteristics.

The pollinia are relatively short and very broad. Note how the pellucid edge cuts off at the end near the caudicle leaving the end slightly protruding. The translators are long and narrow in side view and the caudicles are perfectly formed and large. The caudicles are supported by the translators which are more broad on the top, rather wedge shaped. Here you see only the outer edge.

Photo sponsored by: Jeff Stagg

Critical Measurements: From flowers sent to me by Edward Gilding.

Pedicel: terete, curved 3.8 cm. long, enlarged slightly toward the calyx, 1 mm. in diameter, lenticular parallel striations longitudinally.

Calyx: lobes finely and evenly ciliate, cupped, rather thick in the central portion. Lobes not fused or overlapped at the base with definite easily observed ligules at each sinus, 0.03 cm. long.

Ovaries: upright, bottle shaped 2 mm. tall base circular.

Corolla: campanulate, fluted into 5 envelopes (pleats) at outer half. Glabrous inside granulose outside. Short collar very small hole left from separation of calyx and corolla, Hairs directed inward toward center, around collar and extending to collar, lobes height of flower 1.3 cm. and same width.

Corolla flattened..........

Sinus to apex	0.05 cm.
Center to apex	1.5 cm.
Center to sinus 1.4 cm.	
Apex to apex	1.5 cm.

Apex to sinus	0.55 cm.

Corona: inner lobe not free of the anther even at the apex. Column short 0.05 cm. tall, lower side of lobe finely sulcate and grooved down center. Stylar table shortly apiculate, cleavage of stigma visible.

Center to apex	0.54 cm.
Apex to apex	not recorded
Width (top)	0.15 cm.
Anther wing-aw	0.25 cm.
Aw to center	0.29 cm.
Retinaculum-ret	0.10 cm.
Ret to center	0.10 cm.

HOYA HYPOLASIA Schlechter

Hypolasia in Greek means: under or less than hairy, but what that refers to I have no idea for the leaves have sparse stiff hairs on both surfaces! But, I do know that *Hoya hypolasia* is a pretty hoya - both in the leaves and the flowers.

Chris Burton once said (as you can see on this herbarium sheet that she sent me years ago) that it has the prettiest leaf she had ever seen (alluding to the leaf and its venation).

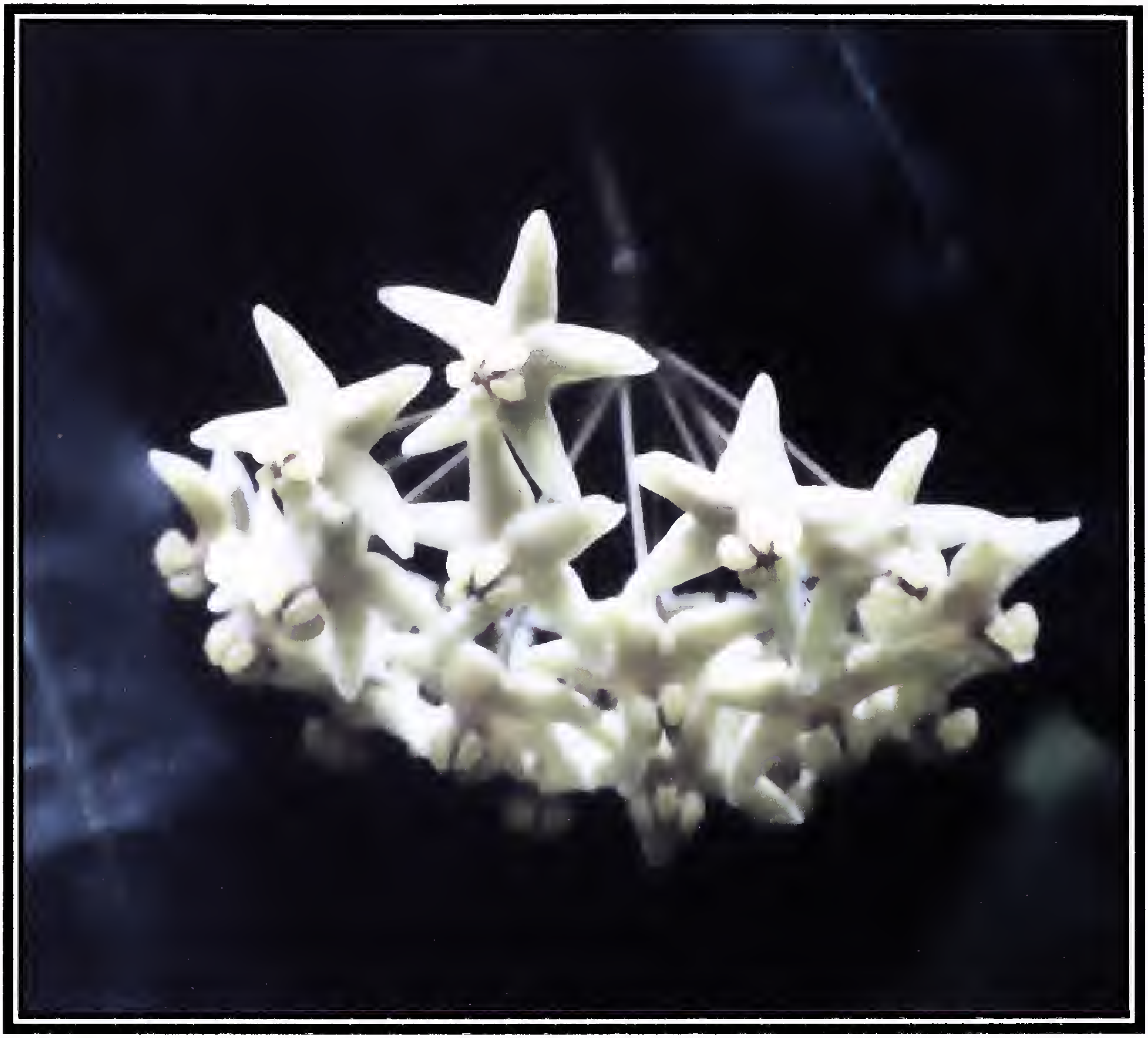
Hoya hypolasia Schlechter is one of the hoyas from the eastern coast of New Guinea and one that Schlechter found July of 1898 and then named in 1913. The plant that I have is from a collection made by David Liddle and Paul Forster when they collected in Schlechter's footsteps. (The species was collected by Dr. Schlechter on 27 July 1908). David said that the plant was growing very close to the town of Madang, at sea level and it was quite common in the area.

In my yard and under my growing conditions, *H hypolasia* is a vine that has long internodes with a rough surface and roots along the stem. The leaves are hate, thick, 3 - 10cm wide x 4 - 8cm long leaf blade and a 1 – 2cm petiole. The surface is dull, dark green and with a sparse covering of stiff hairs. If growing in bright light the leaves tend to develop a reddish cast.

The interesting thing about the white flowers is the puffed-up coronal lobes.

I have had trouble maintaining this plant- but maybe that is because of inattention, when mixed up or lost in other plants. If given the proper attention it is a beautiful thing and would make a valuable asset to any hoya collection.

Ted Green
Green: Plant Research
Kaaawa, Hawaii

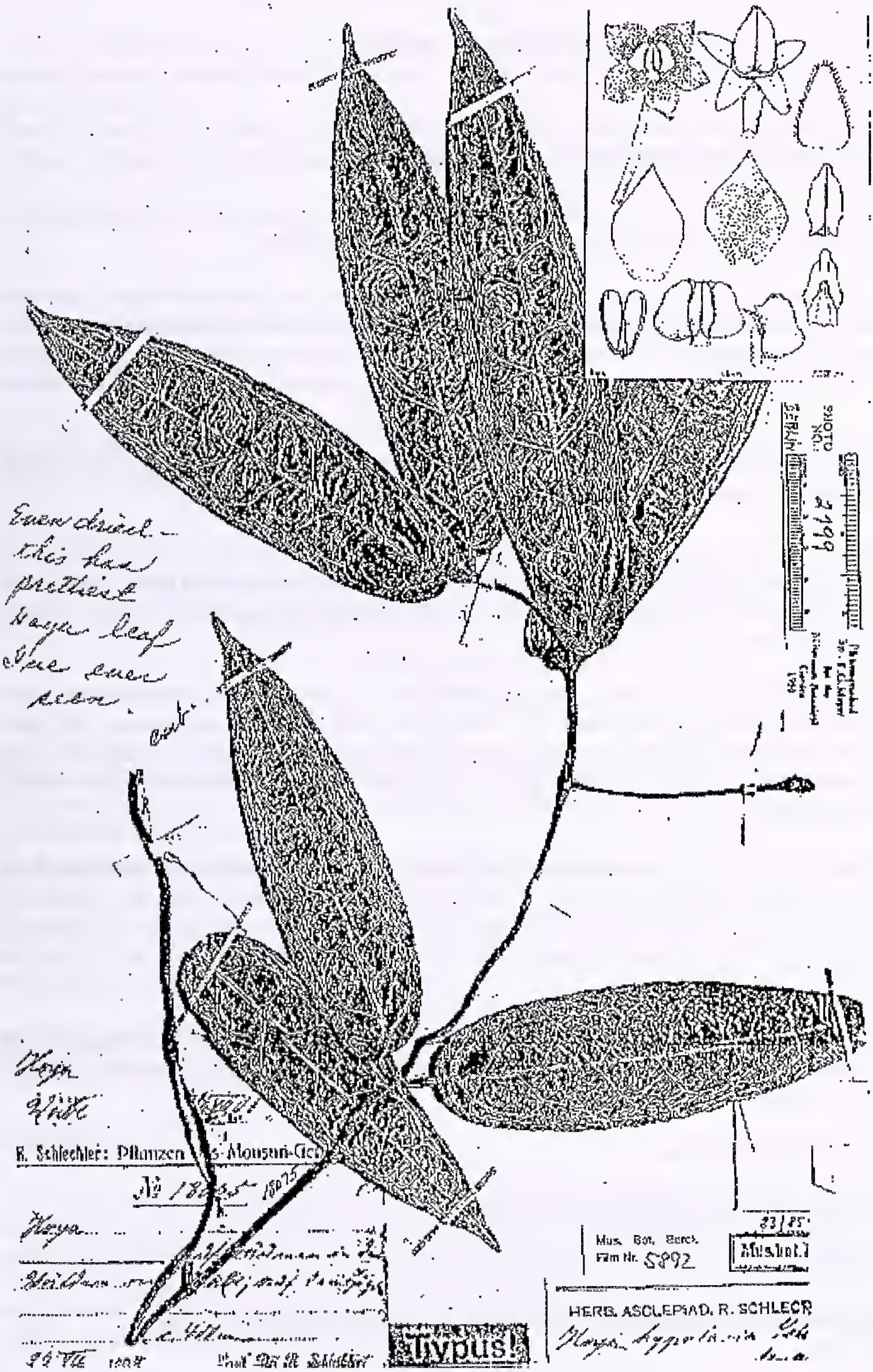


Hoya hypolasia Schlechter

Photo sponsored by: Shay Toner

Note: The type sheet on the following page is reduced from approx. 16" x 11".

Dr. Schlechter's Type Sheet


Even dried – this has prettiest Hoya leaf I've ever seen.
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Mus.bot.
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Wintering Hoyas under Artificial Light

by
P. Victor Sencindiver, M.D.

We are blessed to be living on an earth that is energized by the sun. To my ears, the very word light is one of the most beautiful words in any language.

There is a need in all of us to touch, to smell, and to see living plants. Depending on where we live geographically, the more urgent our need to grow indoors.

Until about sixty years ago, the chief obstacle to such an accomplishment was the impossibility of producing the right kind of light at the right time and of sufficient intensity to make tropical and semitropical plants feel at home in our houses. Successful indoor gardening was limited to areas near windows, or, to the few plants that require a very low level of light to survive.

Those of you who grow hoyas and live at latitudes where you can grow them exclusively outdoors, or who have heated greenhouses are truly fortunate.

Those of us who are not blessed with having either of these available to us must bring our plants that have been happily summering outdoors into the house to winter under much less favorable conditions Luckily we can tap into other light sources that can, in part, bring the 'SUN' indoors with our plants.

The availability of fluorescent, halogen. metal halide, and mercury vapor lamps to be used as our indoor light sources have opened up a whole new vista for plant enthusiasts. The least expensive and relatively efficient of these is the 'fluorescent way'. -- and -- again the least expensive and relatively efficient of these is the use of cool white or combination of cool white and warm white tubes.

Without going into the complexities of foot candles of light, angstroms or wave length or color, what are the basic needs of this type of growing ? Some suggestions from my experience follows:

I. Fixtures:

2 tube, 48 inch set ups are best and combination of cool white and warm white tubes produce satisfactory results. Gro-Lux or other growth tubes can be substituted. Dust is a thief of light - Keep your tubes dusted.

II. Distance of plants from tubes:

Six to eight inches seems to produce the best results.

III. Photoperiodism:

Hoyas seem to be 'day-neutral' plants. 12 - 14 hours of light a day seems to be best.
IV. Fertilization:

Since hoyas grown under lights have no dormant period, they do require more frequent fertilization. Use 1/4 strength fertilizer with each watering.

These conditions do not insure good flower production but they do allow for good healthy plant growth during a period when they would otherwise languish while awaiting the next summers growing season.

"There is no season such a delight can bring, as summer, autumns winter, and the spring."

William Shakespeare

The following article was published by the authors in Asklepios Journal #78 (1999). It is reproduced here by permission of the authors and The International Asclepiad Society in 3 parts. Part 1 was presented in Fraterna Vol. 13, # 2. Part 2 of this article is presented here.

THE GENUS *HOYA* R.BR (ASCLEPIADACEAE: MARSDENIEAE) AS COMMONLY CULTIVATED IN AUSTRALIA

Paul I. Forster (1), David J. Liddle & Iris M. Liddle (2)
(1) Queensland Herbarium, Brisbane Botanic Gardens, Mt Coot-tha road, Toowong, Queensland 4066, Australia
(2) P. O. Box 794, Mareeba, Queensland 4880, Australia

Summary: A concise descriptive account of 37 species of *Hoya* (Asclepiadaceae: Marsdenieae) as encountered in common cultivation in Australia is presented together with an identification key and tentative treatment of cultivars.

Hoya lanceolata Wallich ex D. Don
(synonym *H. sikkimensis* hort.)

Distribution: India

Pendent non-twining herb to one metre long, latex white. Leaf lamina oblanceolate, thin-fleshy, flat, up to 3 cm long and I cm wide, green, silver flecking absent, glabrous; margins entire, not recurved, same colour as rest of lamina; venation penninerved with 6 or 7 lateral veins, ± obscure; base cuneate; tip acuminate. Umbel positively geotropic concave, 1–7 flowers in loose ball. Corolla 12–13 mm diameter, cream; lobes triangular-ovate, c. 6 mm long and 5 mm wide, slightly reflexed, shortly papillose. Corona pale pink.

Recognition: Pendent non-twiner; leaf lamina oblanceolate, thin-fleshy; corona pale pink. Closely allied to *H. bella* (see notes there).

Hoya linearis Wallich ex D. Don (Figure 16)

Distribution: India

Pendent non-twining herb to several metres long, latex white. Leaf lamina linear-lanceolate, fleshy, flat, up to 5 cm long and 0.6 cm wide, green, silver flecking absent, softly hairy; margins entire, not recurved, same colour as rest of lamina; venation penninerved, obscure; base cuneate; tip acute. Umbel positively geotropic concave, 10–15 flowers in tight ball. Corolla 6–7 mm diameter, white; lobes triangular-ovate, 3–4 mm long, 3–4 mm wide, slightly reflexed, shortly papillose. Corona white.

Recognition: Pendent non-twiner; leaf lamina linear-lanceolate.

Hoya longifolia Wallich ex Wight

Distribution: India

Trailing twiner to several metres long, latex white. Leaf lamina oblanceolate, fleshy, ± flat, up to 13 cm long and 2 cm wide, green, silver flecking absent, glabrous; margins entire, not recurved, same colour as rest of lamina; venation penninerved with 7 or 8 lateral veins; base cuneate; tip acuminate. Umbel positively geotropic convex, 5–12 flowers in loose ball. Corolla 16–17 mm diameter, white, dull; lobes triangular, c. 8 mm long and 8 mm wide, slightly inflexed, shaggily papillose. Corona white.

Recognition: Leaf lamina oblanceolate, ± flat. Closely allied to *H. shepherdii.*

Hoya macgillivrayi F. M. Bailey (Figure 13)

Distribution: Australia

Wiry twiner to several metres long, latex white. Leaf lamina lanceolate to ovate, fleshy, flat, up to 20 cm long and 8 cm wide, dark-green, silver flecking absent, glabrous; margins entire, not recurved, same colour as rest of lamina; venation penninerved with 5 or 6 lateral veins; base cordate; tip acute to acuminate. Umbel positively geotropic convex, (12 flowers in loose ball. Corolla 55–80 mm diameter, maroon or red-purple, often with white centre; lobes lanceolate-ovate to triangular, 20–25 mm long, 19–23 mm wide, ± flat to inflexed, glabrous. Corona red-purple.

Recognition: Corolla 55–80 mm diameter, maroon to red-purple.

'Superba' (synonym: 'Big Mac'). A particularly floriferous and dark-coloured clone.

Various clones with locality data are also cultivated. We have not included the closely allied *H. archboldiana* C. Norman (Figure 2) and *H. onychoides* P. I. Forst., D. J. Liddle & I. M. Liddle (Forster et al. 1995) in this account as they have yet to acquire a deserved 'common' status.

Hoya magnifica P. I. Forst. & D. J. Liddle (Figure 14) (synonym: *H. sp.* New Guinea White)

Distribution: New Guinea

Wiry twiner to several metres long, latex white. Leaf lamina elliptic-ovate to narrow-ovate, fleshy, flat up to 19 cm long and 10 cm wide, green, silver flecking absent, velutinous hairy; margins entire, not recurved, same colour as rest of lamina; venation penninerved with 5 or 6 lateral veins, ± obscure; base cordate to rounded; tip acute, acuminate or apiculate. Umbel positively geotropic convex, 8–15 flowers in loose ball. Corolla 22–25 mm diameter, white with small area of red under corona; lobes triangular, 15–18 mm long, 15–18 mm wide, inflexed to ± flat, glabrous. Corona cream to white.

Recognition: Corolla 22-25 mm diameter, white.

Hoya micrantha Hook. f.

Distribution: Burma, Thailand, Malaysia

Wiry twiner to several metres long, latex white. Leaf lamina elliptic to oblanceolate, fleshy to succulent, flat, up to 18 cm long and 5 cm wide, dark-green, silver flecking absent, glabrous; margins entire, not recurved, same colour as rest of lamina; venation penninerved with 4 or 5 lateral veins, ± obscure; base cuneate; tip acute to acuminate. Umbel positively geotropic concave, 1–25 flowers in tight ball. Corolla c. 8 mm diameter, pale yellow to orange; lobes ovate, 4–5 mm long, 4–5 mm wide, strongly reflexed, shortly papillose. Corona pale yellow to orange.

Recognition: Corolla c. 8 mm diameter, pale yellow; corona pale yellow to orange.

Hoya motoskei Teijsm. & Binn.

(synonym: *H.* 'Snowball', *H.* 'Thailand White')

Distribution: Thailand

Wiry twiner to several metres long, latex clear. Leaf lamina elliptic, fleshy, i flat, up to 10 cm long and 4 cm wide, dark-green, silver flecking present, glabrous; margins entire, not recurved, same colour as rest of lamina; venation penninerved with 8 or 91ateral veins; base cuneate; tip acute to acuminate. Umbel negatively geotropic convex, 15–50 flowers in tight ball. Corolla 15–18 mm diameter, silvery white; lobes ovate, 7-8 mm long, 5–6 mm wide, ± flat to slightly reflexed, shortly papillose. Corona silvery-white to red.

Recognition: Clear latex. Leaves with silver flecking. Often misidentified in cultivation.

Hoya multiflora Blume (Figure 15)

(synonym: *Centrostemma multiflora* (Blume) Decne.; H. 'Shooting Star')

Distribution: China, Philippines, Java, Malaysia

Erect non-twining herb to 50 cm high, latex white. Leaf lamina elliptic-oblong to oblanceolate, leathery, flat, up to 15 cm long and 7 cm wide, green, silver flecking sometimes present, glabrous; margins entire, not recurved, same colour as rest of lamina; venation penninerved with 11 or 12 lateral veins, i obscure base cuneate; tip acute to acuminate. Umbel positively geotropic convex, 20–40 flowers in loose ball. Corolla 18–20 mm diameter, yellow; lobes lanceolate-oblong, 13–15 mm long, 4–5 mm wide, strongly reflexed, glabrous. Corona cream.

Recognition: Erect, non-twiner; corolla yellow, strongly reflexed.

Hoya nummularioides Costantin
(synonym: *H. pubera* auct., non Blume)

Distribution: Indochina

Wiry twiner to several metres long, latex white. Leaf lamina orbicular-ovate, leathery, flat, up to 3 cm long and 2 cm wide, green, silver flecking absent, velutinous hairy; margins entire, not recurved, same colour as rest of lamina; venation penninerved, obscure; base rounded; tip acute to rounded. Umbel positively geotropic concave, 15–25 flowers in tight ball. Corolla 5–6 mm diameter, pink-white; lobes oblong-ovate, c. 3 mm long and 2 mm wide, flat, shortly papillose. Corona pink.

Recognition: Leaf lamina orbicular-ovate, venation obscure; corolla pink-white; corona pink.

Hoya obovata Decne. (Figure 21)

Distribution: Malesia

Wiry twiner to several metres long, latex white. Leaf lamina orbicular to obovate, succulent, flat, up to 8 cm long and 6.5 cm wide, green, silver flecking present, glabrous; margins entire, not recurved, same colour as rest of lamina; venation penninerved with 5 or 6 lateral veins, ~ obscure; base cuneate or rounded; tip obtuse to notched. Umbel negatively geotropic convex, 15–25 flowers in tight ball. Corolla 9–11 mm diameter, white to pale-pink; lobes oblong-ovate, 3.5–4 mm long, 3.5–3.8 mm wide, slightly reflexed, shortly papillose. Corona pink-red.

Recognition: Leaf lamina with silver flecking; corolla white to pale pink; corona pink-red.

Hoya obscura Elmer ex C. M. Burton

Distribution: Philippines

Wiry twiner to several metres long, latex white. Leaf lamina elliptic to obovate, fleshy, flat, up to 10 cm long and 4 cm wide, green and gold-brown, silver flecking absent, glabrous; margins entire, not recurved, same colour as rest of lamina; venation very prominent, penninerved with 5 or 6 lateral veins; base cuneate or rounded; tip acute to acuminate. Umbel positively geotropic concave, 15–30 flowers in tight ball. Corolla 7–8 mm diameter, pale-pink; lobes triangular-ovate, c. 4 mm long and 3 mm wide, strongly reflexed, shaggily papillose. Corona orange.

Recognition: Corolla 7 - mm diameter, pale-pink; corona orange.

Hoya odorata Schltr. ex Merr. (Figure 17)

Distribution: Philippines

Erect, non-twiner to 50 cm high, latex white. Leaf lamina elliptic to obovate, leathery, flat, up to 6 cm long and 2.2 cm wide, green, silver flecking absent, glabrous; margins entire, not recurved, same colour as rest of lamina; venation penninerved with 8 to 10 lateral veins; base cuneate; tip acuminate. Umbel positively geotropic convex, 4–16 flowers in loose ball. Corolla 20–23 mm diameter, white; lobes oblong-ovate, 1–12 mm long, 5–6 mm wide, weakly inflexed, shortly papillose. Corona pale-yellow.

Recognition: Erect, non-twiner; corolla 20–23 mm diameter; corona pale-yellow.

Hoya parvifolia Schltr.
(synonym: H. sp. Sarawak)

Distribution: Sarawak

Wiry twiner to several metres long, latex white. Leaf lamina elliptic to orbicular, succulent, flat, 1–1.5 cm long, 0.8–1 cm wide, green, silver flecking absent, velutinous hairy; margins entire, not recurved, dark purple; venation penninerved, obscure; base rounded; tip acute. Umbel positively negatively geotropic concave, 5–15 flowers in loose ball. Corolla 5–7 mm diameter, yellow-apricot; lobes lanceolate-ovate, 4.5–5 mm long, c. 4 mm wide, strongly reflexed, shortly papillose. Corona yellow-apricot.

Recognition: Corolla 5–7 mm diameter; corolla and corona yellow-apricot.

Hoya pauciflora Wight

Distribution: India, Sri Lanka

Wiry twiner to several metres long, latex white. Leaf lamina oblanceolate, fleshy, flat, 3–4 cm long, 0.5–0.8 cm wide, green, silver flecking absent, glabrous; margins entire, not recurved, same colour as rest of lamina; venation penninerved, obscure; base cuneate; tip acute to acuminate. Umbel positively geotropic convex, 1–2 flowers in loose ball. Corolla 1–18 mm diameter, white; lobes broad-triangular, 6–7 mm long, 6–7 mm wide, inflexed, shortly papillose. Corona red.

Recognition: Leaf lamina oblanceolate; corolla white; corona red.

Hoya polyneura Hook. f.

Distribution: India

Wiry twiner to several metres long, latex white. Leaf lamina oblanceolate to ovate, often irregular leathery, flat, up to 10 cm long and 4 cm wide, pale-green, silver flecking absent, glabrous; margins entire, not recurved, same colour as rest of lamina; venation penninerved with 8 to 10 lateral veins; base cuneate or rounded; tip acuminate. Umbel positively geotropic convex, 4–20 flowers in loose ball. Corolla 11–13 mm diameter, yellow; lobes oblong-ovate, 6–7 mm long, 4.5–5 mm wide, strongly reflexed, shortly papillose. Corona red.

Recognition: Corolla 11–13 mm diameter, yellow; corona red.

Hoya pottsii Traill (synonym: H. *nicholsoniae* F. Muell.)

Distribution: Australia, New Guinea

Wiry twiner to several metres long, latex white. Leaf lamina ovate to broadly-ovate, fleshy to succulent, flat, up to 21 cm long and 10 cm wide, green to green-brown, silver flecking absent, glabrous; margins entire, not recurved, same colour as rest of lamina; venation palminerved with

3 veins from base; base cordate; tip acute. Umbel negatively geotropic convex, 1–25 flowers in tight ball. Corolla 10–18 mm diameter, cream, green or yellow; lobes lanceolate-ovate to broad-ovate, 6–7 mm long, 4.5–6 mm wide, strongly reflexed, minutely papillose, appearing glabrous. Corona cream, green or yellow.

Recognition: Leaf lamina prominently 3-nerved from base. A large number of clones are in cultivation with different coloured flowers.

Hoya pubicalyx Merr. (Figure 18) (synonym: *H. purpureo-fusca* auct. non Hook.)

Distribution: Philippines

Wiry twiner to several metres long, latex white. Leaf lamina elliptic to oblanceolate, fleshy, flat, up to 14 cm long and 5 cm wide, green, silver flecking present, glabrous; margins entire, not recurved, same colour as rest of lamina; venation penninerved with 6 or 7 lateral veins, ± obscure; base cuneate or rounded; tip acute or acuminate. Umbel negatively geotropic convex, 15–0 flowers in tight ball. Corolla 17–19 mm diameter, pink-purple to red-black; lobes oblong-ovate, 7–8 mm long, 5–6 mm wide, slightly reflexed, shaggily papillose. Corona cream-pink to pink-purple.

Recognition: Corolla pink-purple to red-black, shaggily papillose; corona cream-pink to pink-purple. This species is often misidentified in cultivation. A number of clones are in cultivation. Some have cultivar names, others do not.

'Red Buttons' Corolla red-black; corona pink-purple. Smaller flowers than 'Hawaiian Royal Purple'.

'Hawaiian Royal Purple' Corolla red-black; corona pink-purple. Larger flowers than 'Red Buttons'.

'Silver Leaf' Corolla pink-purple; corona cream-pink.

Hoya samoensis Seem. (synonym: *H. cominsii* Hemsl.)

Distribution: New Caledonia, New Guinea, Solomon Islands, Vanuatu

Wiry twiner to several metres long, latex white. Leaf lamina elliptic-ovate to ovate, fleshy to succulent flat, up to 8 cm long and 6 cm wide, green to yellow-brown, silver flecking absent, glabrous; margins entire, not recurved, same colour as rest of lamina; venation palminerved with 7 veins from base; base cordate; tip acute to acuminate. Umbel negatively geotropic convex, 8–25 flowers in loose ball. Corolla 1–15 mm diameter, yellow to salmon-apricot; lobes oblong-ovate, 6–7 mm long, 4–4.5 mm wide, weakly to strongly reflexed, glabrous. Corona yellow to salmon-apricot.

Recognition: Leaf lamina 7-nerved from base.

Q&A

Questions and Answers about HOYAS

1. Q. Now that the world wide web (www) is so popular, how many sites do you suppose there are? A. More every day! I went to the new search engine "Google", typed in Hoya, Plants and it came up with 1,269 related hits. A few were duplicates. I have not tried to search all the other engines but I am sure there are more!

2. Q. I read in some literature that there are 100 hoya species and in others 200 and still others even more, what do you think? A. Odd you should ask as recently many of us have speculated on the same thing. I just read of the discovery of a new city in the Egyptian desert (archeologically speaking) many people have been looking in that country for such a long period and still things are being found, even a new 60,000 year old settlement was recently discovered in Lebanon. Back to hoyas.......There are thousands of square miles of mountains, jungles with untold miles of trails, river courses, mountain ridges, gullies that no hoya collector or taxonomist has even been to many of these places. Most likely there are 300 to 600 hoya species, and that, in the end, even that figure may prove to be conservative. There will soon be 3 new species named from work done in central Sulawesi.

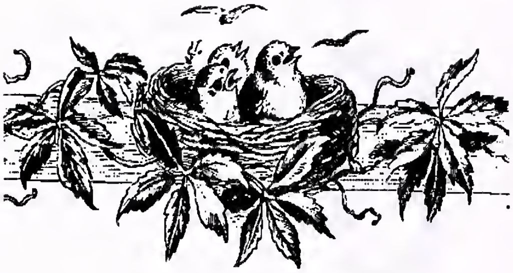
3. Q. I have a plant that just sits there, it does not grow or die, what can I do? A. I'd say you have 3 possibilities. First you may take some new cuttings from the plant and try starting over again. It could be that your plant is infected with root knot nematode. Next, repot it into a sterile pot with new soil and some complete fertilizer. Finally, have you watered it on a consistent basis, fertilized it regularly, given it adequate light? One last thought- try a systemic fertilizer and see if that works, or try all the above.

3. Q. How long will a plant survive in the same pot and when does it need to be repotted? A. I really do not know! I have some *Hoya kerrii* that have been in a 4" plastic pot on a greenhouse bench since 1976. A *Hoya obovata* in a 10" pot and some *Hoya diversifolia* plants in 4" and 6" pots since 1979. There is no soil left- only a mass of roots. The plants are 20-30' long or more. These plants are all strong growers and are in the same section, and thus have similar characteristics. Evidently they are satisfied with only the roots tightly confined. The plants, except in the winter, get watered adequately and fertilized (what will stick in the root mass). I do not think all species will thrive under these conditions but many will.

5. Q. Can I get rid of mealybugs by spraying with alcohol ? A. I will say that you can really clean up the plants with this spray. Go over your plants every day and inspect the new growth and the axils of leaves, spray lightly any mealy bugs you see. You will soon find any plants completely clean. I do not believe you will ever eliminate them all but you should find fewer and fewer if you are persistant. Daily inspections will keep your plants in top condition.

BIRD TRACKS

From: Robin Director



Rosemary Peterson
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Long Beach, CA 90808
(562) 425-4765

Attention all IHA members! Give a membership of IHA to a friend, a plant enthusiast, or a family member, maybe best of all a young person. Young people are the future of any society so get them involved. Give a slide talk at your local school or church function. Take time to get involved in your association? Join a robin and meet nice people, exchange ideas, learn new things about Hoyas, exchange cuttings, increase your collection and have fun doing it? If not be brave and do so now! ....Above all, enjoy life!

Robin #3 Carita, Finland.(Jan, 2000) I have had some new bloomers this Autumn. First *H. thomsonii*, which bloomed with extremely perfumed pure white flowers. It had only one umbel, but it was enough, the fragrance was so heavy. Another Autumn bloomer, *H. calycina ssp. calycina* had 7 umbels this year, the odor was terrible!! The buds opened one by one so I had to smell the "perfume a'la horses" for a month. The flowers are very beautiful, pure white with blood red under the crown. The flowers are big more than an inch in diameter. They last a very, very long time, nearly 2 weeks...and so does the fragrance, too, unfortunately. *H. caudate* "Sumatra" bloomed also for the first time. It was open for only 3 days and I missed photographing it.

Robin #3. Anne, ID. (Feb, 2000). I hope everyone looked at the new web site, I was really impressed with it. I have noticed buds on *Hoya pusilla* and one *carnosa* that had grown into a hanging lamp has bloomed off and on all winter. I love the smell if I get up at night to stoke the fire.

Robin #3. Debbie, NV (April 2000). I wanted to share the highlights of our vacation. We headed to Oahu and drove to see Ted Green. He didn't have many hoyas in bloom at the time, but he sure has plants everywhere. They are growing up into surrounding trees and inter-twining among themselves. What a great experience it was. The leaves on his plants are much thicker and a whole lot larger than mine. After seeing these plants eye to eye, my "wish list" has grown three times longer. I even got a picture of a lizard sitting on a *Hoya kerrii* leaf.

Robin #3. Harriette, CA. (April 2000). If you can manage to spray on a 3 to 4 day cycle, it breaks the life cycle of the mealybugs. Therefore you do not get new ones hatching and maturing. The best way to handle spider mites is to just spray. They do not seem to like higher humidity. The alcohol and the detergent will help. With spider mites I am not sure.

Robin #3. Rosemary. CA. (April 2000) On hoyas... my precious *H. serpens* seedling has not moved, it is not growing at all. I am going to be bold and sit it outside later in the spring with the hope the change will gear it into action. Many of my plants have started their life cycle of growing, but have yet to do much. We are patient and await the splendor to come.

Get in touch with Rosemary and join a robin, it's fun and informative.

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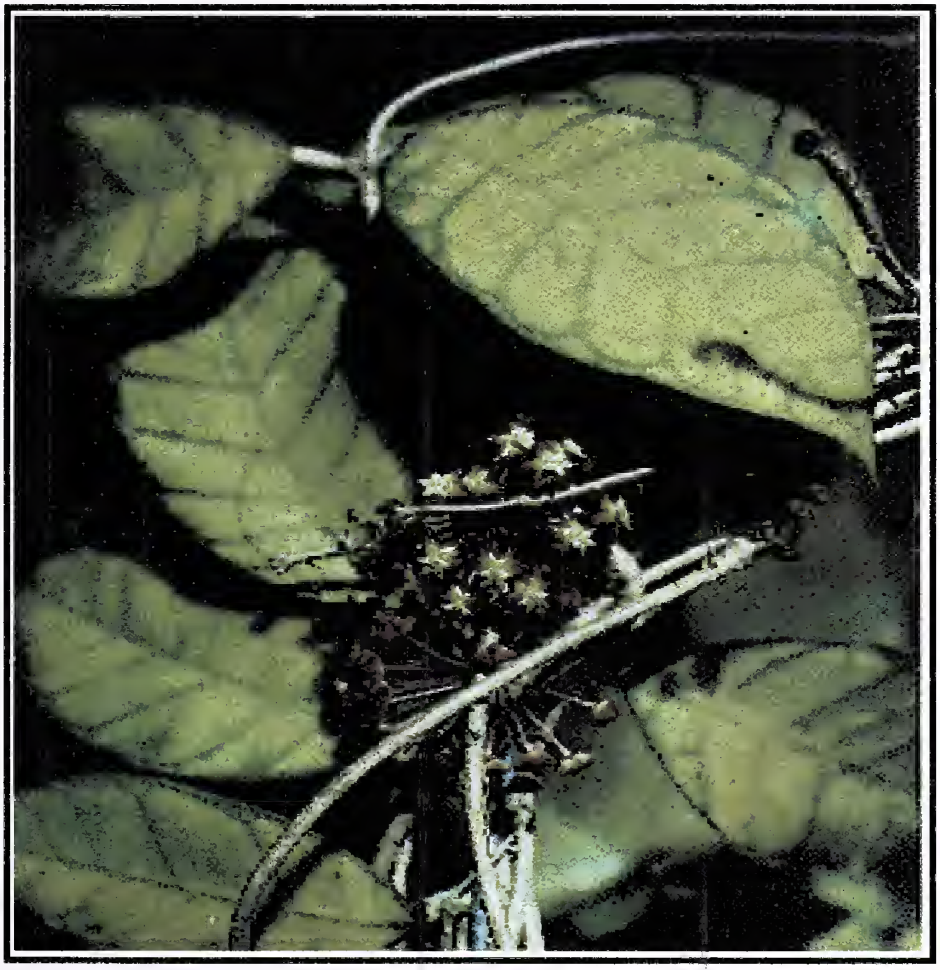

Hoya callistophylla Green
Photo by Ted Green

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Errors of fact may occur from time to time in "Fraterna". It is the policy of the IHA to publish corrections of fact, but will not comment on matters of opinion expressed in other publications.

Fraterna

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The President's Message

By Dr. Harriette Schapiro

Another year is almost gone. For many of us, our plants are safely tucked into greenhouses or homes and not growing as fast as they usually do during the summer. Take care to watch for mealy bugs and those other pests that can spread so fast without good air circulation, I am also extra careful to not water to excess. The combination of wet soil and cool to cold weather seems to kill more plants than any other combination of factors.

I am hoping for a winter with more or less normal rainfall to reduce my outside tasks. There are several things I would like to get done for The Fraterna. I will get the year 2000 index of species completed. In addition to that necessity, I would like to get an index of articles and topics created for all back issues. (That comes under the heading of a pain in the neck job! Of course, if anyone would like to volunteer to do that job, I will see that they get Xerox copies of all back issues of The Fraterna!). Hopefully, a comprehensive index will make the information in The Fraterna much more accessible. I know I have spent time trying to locate one specific article I know is in the journal and having to go through all too many issues to find what I want.

Our web site is averaging over 1200 'hits' a month and growing. More photos will be added to enhance the Hoya Gallery. We have been getting a steady flow of new members through the site.

We, as always, need more involvement from you. Join a Robin. Borrow the Hoya slide show and use it as a program at a plant society meeting. Write even a short article on something that interests you about specific Hoya or Hoyas in general. If you have a favorite plant growing technique, share it with others. This is YOUR International Hoya Association, become more active.

May the twenty first millennium bring all of us good times, good health and good growing.

Harriette Schapiro, President I. H. A
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Our Cover Story:

THE SABAH BEAUTY HOYA – *HOYA CALLISTOPHYLLA* Green

In the central area of Sabah, Eastern Malaysia, about 45 miles east of Keningau, is Nabawan. Nabawan has been known for its logging operation in the past but the more important thing is that it is the location of Tony Lamb's " Enchanted Forest" - near the old airstrip.

This is one of those open rainforests, of sandy podsolic soil, with 60 ft. trees overhead and small 15-20 ft. sapling under-trees. Litter and mosses cover the ground. It is quite level with some standing water – which really raises the humidity. In the open, sunny places there are beautiful Pitcher Plants (Nepenthes) and terrestrial orchids (Bromheadia), ferns and mosses. On the ground and in the shade are Coelogyne orchids (believe it or not, but the long, flower stems are lying on the forest litter), mosses; and, in the saplings and bushes are Hoyas, Dischidias and scrambling Nepenthes.

This "Heath forest" is an enchanted place for to stroll here is nothing like collecting in the dark forests. It is fresh and park-like.

On one of those sapling trees in this forest Ben Wallace and Tony Lamb discovered a handsomely leafed Hoya - a vine about 3 feet long, with umbels of ½", yellow and reddish-brown tipped flowers. By later growth, it was shown that the 3 ft. vine was very young for it can get to be 5 times that size.

As usual with all wild plants, this Hoya did not have a label on it and for the past 15 years I have searched herbaria to see what it might be. No luck, so that this plant should have a fitting name and because of its beautiful leaves, I would like to name this plant **Hoya callistophylla**, from the Greek, *kalisto* = most beautiful and *phyllum* = leaf.

HOYA CALLISTOPHYLLA, Green sp. nov. (Asclepiadaceae)

Affinis speciei *Hoyae finlaysonii,* Wight sed differns foliis habentibus venas ornatas atque coronis stamineis lobis triangularibus et elevatis ad exteriores apices.

Related to *Hoya finlaysonii,* Wight, but differing in the ornately veined leaves and coronal lobes being triangular and raised at the outer tip.

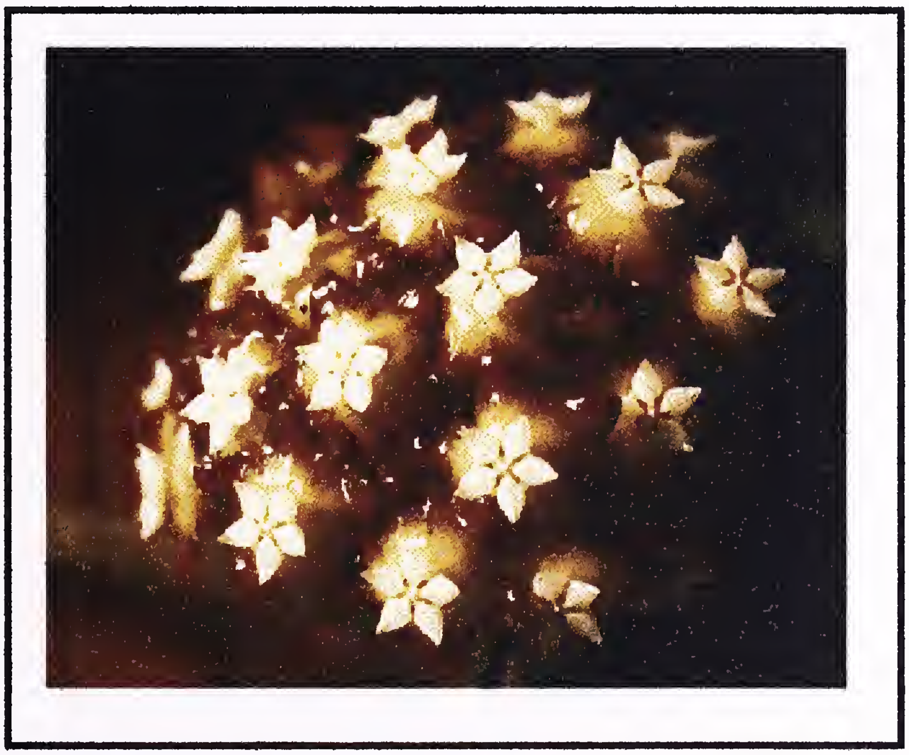
Holotype: Bishop Museum, Ted Green No. 201 ex hort. Ted Green of Kaaawa, Hawaii. From Nabawan, Sabah, Eastern Malaysia, SBG 851980/BJ 84304

A strong, tropical vine, rooting along the stems; leaves opposite, elliptic to lanceolate with attenuate tips, cuneate bases, prominent, pinnate, dark green venation, substance heavy and hard, with a matte surface; persistent peduncles bear hemispheric umbels of 20-40, yellow with reddish-brown tipped, 1cm in diameter flowers. Follicles not seen. Sap, milky white. Fragrance pleasant. Flowers stay open for only one day - during daylight hours..

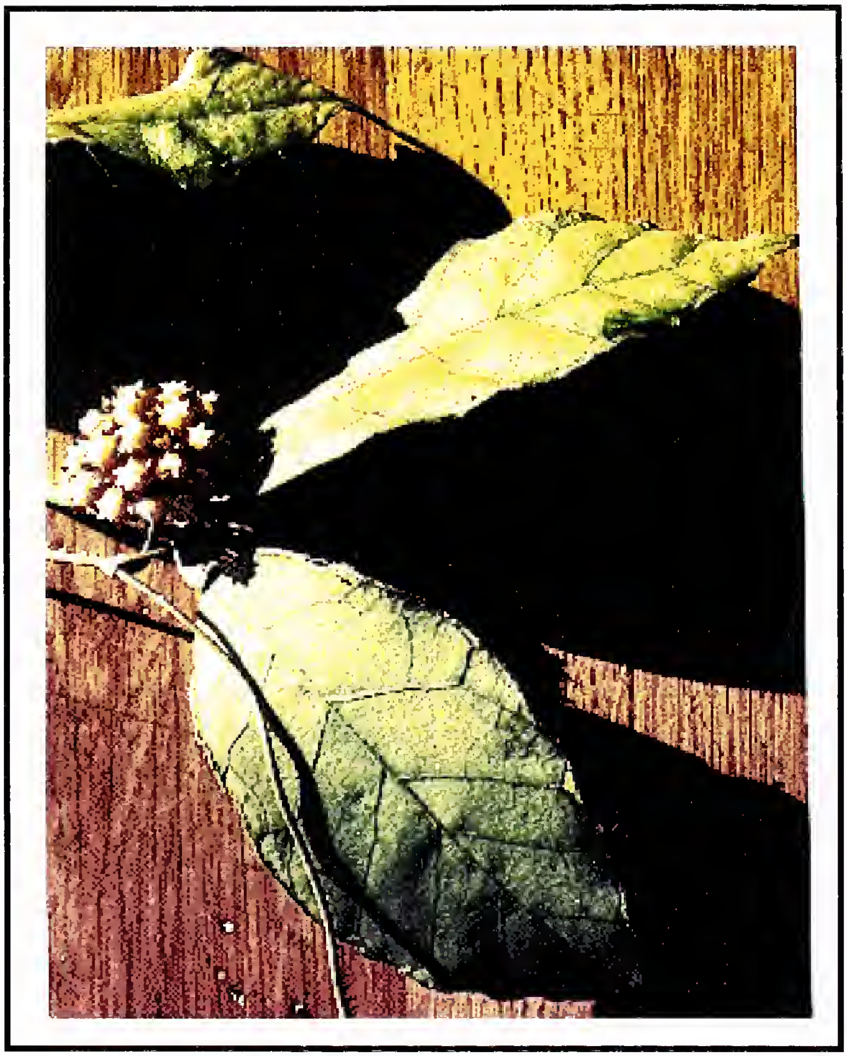
Leaf blade:	Elliptic to lanceolate, 10-20cm long x 6-10cm wide x 1mm thick, matte surface, light green with dark green veins, lateral veins approx.60° to midvein; edge hard, irregular and sharp.
Leaf venation:	Pinnate
Petiole:	5mm diameter x 10 -15mm long, rough surfaced, tan.
Peduncle:	3mm diameter x 2cm long, at first flowering, greenish-tan.
Pedicel:	1mm in diameter x .5-2cm long, green.
Sepal:	1mm x 2mm, obtuse, outer surface papillose, yellow spotted red.
Corolla:	1cm in diameter, flat to reflexed, glabrous, yellow with reddish-red tips.
Corona:	5mm in diameter, triangular outer lobe, slightly raised across top and tip upward turned, white

Conservation: This plant has been distributed to collectors world-wide and is not in danger of extermination. In the wild it has been found in several locations, other than Nabawan, that are out of the way of development.

Ted Green
Green: Plant Research
Kaaawa, Hawaii



Hoya callistophylla Green



Hoya callistophylla Green

The above photos taken in Hawaii by the author, Ted Green

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THE GENUS *HOYA* R.BR (ASCLEPIADACEAE: MARSDENIEAE) AS COMMONLY CULTIVATED IN AUSTRALIA

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Summary: A concise descriptive account of 37 species of *Hoya* (Asclepiadaceae: Marsdenieae) as encountered in common cultivation in Australia is presented together with an identification key and tentative treatment of cultivars.

Hoya serpens Hook. f.

Distribution: India

Pendent non-twiner to I metre long, latex white. Leaf lamina orbicular, fleshy, flat, 1.3–1.7 cm long, 1.3–1.7 cm wide, green, silver flecking absent, velutinous hairy; margins entire, not recurved, same colour as rest of lamina; venation penninerved, obscure; base cordate; tip obtuse. Umbel positively geotropic concave, 8–25 flowers in loose ball. Corolla 13–15 mm diameter, pale-green; lobes triangular, 6–7 mm long, c. 6 mm wide, ± flat to inflexed, shaggily papillose. Corona pale-green.

Recognition: Pendent non-twiner; corolla and corona pale-green.

Hoya shepherdii Short ex Hook.

Distribution: **India**

Wiry twiner to several metres long, latex white. Leaf lamina lanceolate to oblanceolate, succulent, usually incurved with age, up to 20 cm long and 1.5 cm wide, dark-green, silver flecking absent, glabrous; margins entire, not recurved, same colour as rest of lamina; venation penninerved, obscure; base cuneate; tip acute. Umbel negatively geotropic convex, 5–10 flowers in tight ball. Corolla 18–20 mm diameter, waxy-white; lobes ovate, 7–8 mm long, 6–7 mm wide, inflexed, shaggily papillose on edges only. Corona white with pink on inner edges.

Recognition: Leaf lanceolate to oblanceolate; corolla waxy-white and shaggily papillose on edges only. Closely allied to *H. longifolia.*

Hoya subquintuplinervis Miq.
(synonym: *H. sp.* 'Chiang Mai')
Distribution: Thailand

Wiry twiner to several metres long, latex white. Leaf lamina broad-ovate, succulent, flat, up to 12 cm long and 9 cm wide, dark-green, silver flecking absent, glabrous; margins entire, not recurved, same colour as rest of lamina; venation palminerved with 5 veins from base; base cordate to rounded; tip acute. Umbel negatively geotropic convex, 10–30 flowers in tight ball. Corolla 13–15 mm diameter, cream; lobes lanceolate-ovate, c. 6 mm long and 4.5 mm wide, strongly reflexed, glabrous. Corona cream.

Recognition: Leaf lamina 5-nerved from base; corona cream. The identity of this plant is open to debate and those in cultivation may be referable to *H. latifolia* G. Don.

Hoya tsangii C. M. Burton
(synonyms: *H.* 'Honeydew', *H. sp.* Philippines)

Distribution: Philippines

Wiry twiner to several metres long, latex white. Leaf lamina elliptic, orbicular or ovate, fleshy, flat, 1–1.5 cm long, 0.8–1.4 cm wide, green, silver flecking absent, velutinous hairy; margins entire, not recurved, blue-green to purplish; venation penninerved, obscure; base cordate to rounded; tip acute to notched. Umbel positively geotropic concave, 15-30 flowers in tight ball. Corolla c. 5 mm diameter, red; lobes lanceolate-triangular, c. 3 mm long and 2 mm wide, strongly reflexed, shaggily papillose. Corona red & yellow.

Recognition: Leaf lamina with blue-green to purplish margin; corolla red; corona red and yellow.

Cultivation

General Conditions

Because the many species of *Hoya* originate from varied habitats, a single method of cultivation is unlikely to be successful for all species. The majority of species, although succulent to fleshy, will not tolerate long periods of drought with associated high temperatures (> 40°C) and low humidity. Very few species will tolerate similar conditions to those required for the successful cultivation of cacti, succulent euphorbs or succulent Stapelieae. Exceptions may be found in *Hoya australis* subspp. *australis, oramicola, rupicola* and *sanae,* all of which will tolerate dry conditions, high light and temperature and low humidity. In particular the highly succulent *H. australis* subsp. *rupicola* should be treated as one would a cactus, with long periods of drought required.

The majority of hoyas require regular water, high humidity and bright light to both grow and flower. Most hoyas will grow well in dense shade producing masses of green foliage; however, it is unlikely that they will flower or at least flower well. The grower needs to make the decision as to whether they require lots of green foliage and no flowers, or alternatively in some cases, less attractive foliage and many flowers.

Plants can be grown in hanging baskets or on trellises, but we have found the most space efficient method is to grow them in small pots (c. 10–15 cm diameter) on a small hanger that is hung on a long wire. The plant can then twine up the wire towards the shadehouse roof and the sun, usually flowering all the way along the wire support. Very little soil is actually required, remembering these plants are usually epiphytic in habitat, with only shallow rooting on the substrate. Nearly all species are cold insensitive, so heated plant-houses are required in those frigid parts of the globe where people live and nurture the botanical curiosities of the tropical climes.

Substrates

Potting substrates should be light and well drained. A mixture with a high proportion of peat, some organic matter, and various inert substances (e.g. perlite, sand) is generally suitable. Relatively few nutrients are required, although some very light fertilizer application may be required if plants remain in the same containers for some time.

Propagation

The easiest method is by cuttings. These should comprise a minimum of a single node, but ideally should have 2-3 nodes. Cuttings of older, hardened stems are best and can be made at any time of the year when temperatures are conducive to growth. The cuttings should be made with a sharp knife/secateurs, rather than pulled from the parent plant. They do not require drying off, but should be immediately inserted into the rooting medium. This rooting medium should comprise a mixture of peat/perlite/sand, although it is likely that different mixes will be equally successful. Cuttings should be regularly watered or misted, and if successful, within several weeks new shoots should develop. Once these new shoots have started, the plants should be potted into the containers where they are intended to be grown for floral development.

Propagation from seed is also quite easy; however, some care should be exercised in ensuring that the origin of the seed is known. Where many species are grown together, it is quite common for hybrid seed to form, and while the resulting plants may be interesting, in most cases they add little to the horticultural potential of the genus.

Seed should be planted within two or three months of the seed pod splitting. The seeds should be individually planted in a sandy mixture, probably similar to that used for striking cuttings. If the seed is fertile germination should occur within 10 days of planting. Growth of seedlings is usually rapid, and the individual plants should be ready for potting up within 6 months from germination.

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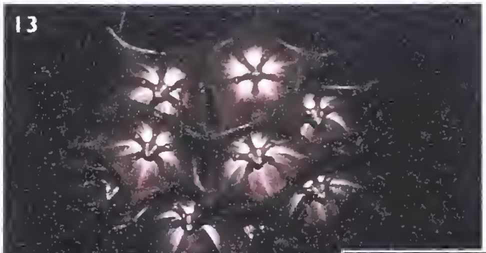
Plate 3: Captions to Colour Illustrations Opposite.

Figure 13. *Hoya macgillivrayi,* IMLI7. Photo: D. J. Liddle.
Figure 14. *Hoya magnifica,* 1ML136. Photo: D. J. Liddle.
Figure 15. *Hoya multiflora,* 1ML182. Photo: D. J. Liddle.
Figure 16. *Hoya linearis,* (ML 139. Photo: D. J. Liddle.
Figure 17. *Hoya odorata,* IML 189. Photo: D. J. Liddle.
Figure 18. Hoya *pubicalyx,* 1ML728. Photo: D. J. Liddle.
Figure 19. *Hoya purpurea,* 1ML68. Photo: D. J. Liddle.
Figure 20. *Hoya subcalva,* 1ML229. Photo: D. J. Liddle.
Figure 21. Hoya *obovata,* 1ML269. Photo: D. J. Liddle.
Figure 22. Hoya *sussuela,* P1F4220. Photo: D. J. Liddle.
Figure 23. *Hoya padangensis,* 1ML42 I. Photo: D. J. Liddle.
Figure 24. *Hoya polystachya,* (ML 161. Photo: D. J. Liddle.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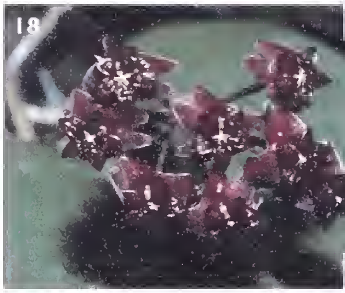
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Hoya recurvula Kloppenburg

Hoya recurvula Kloppenburg sp. nov. *Hoya acutae* Haworth affinis, sed externus apices coronae recurvus. Intus corollae puberulus, extus glabrous. Typus (UC) #81009 ex hort. Dale Kloppenburg, Fresno, California. From Southern Malaysia.

Related to *Hoya acuta* Haworth but the outer coronal lobe apex here is bent back at a sharp angle, otherwise coronal scales are horizontal, slightly concave on the dorsal side with inner apex slightly raised, short and dentate. The inner apex does not reach the center. Corolla revolute at maturity, pale yellow, glabrous outside, inside finely pubescent (puberulent). This is a vining climber well leaved with pairs of lanceolate foliage, 8.0 - 12.0 cm. long by ca. 3.5 cm. wide held mostly upright along the stem; flat to slightly curved, apex acute. Petiole, terete, at first bronze-green becoming corky with age, terete, curved, no groove, about 5 mm. in diameter. The rachis bears fasciculeated clusters of flowers. Blades dull deep green above with this surface splotched with silvering and rose markings, below more pale; veins visible in young foliage, pinnate to anastomosing but enervis with age. Edges entire. Peduncles usually with 12 to 24 flowers ca. 6.0 cm. long curved held perpendicular, rachis with pedicel clusters. Pedicels straight, terete, glabrous 2.7 cm. long 0.11 cm. in diameter. Calyx small, short, granulate outer surface with a few hair cells, inside glabrous, membranous. Sepals barely visible (more like protuberances). 0.18 cm. long widest 0.10 cm., variable, little overlap, ligules at base of ovaries short 0.15 cm. high and wide at the base.

Corolla:

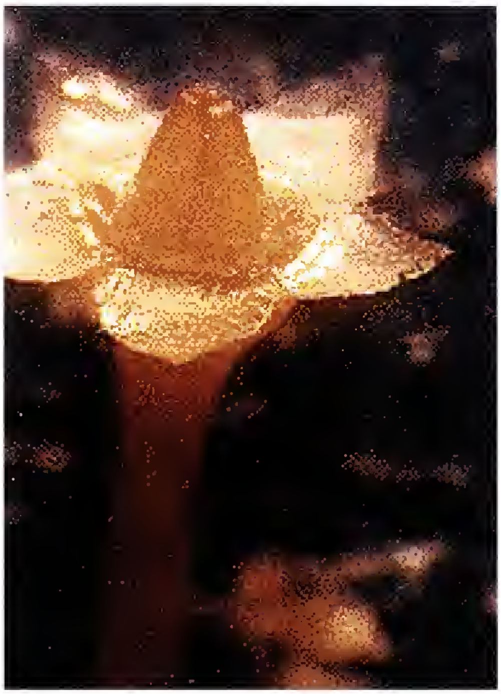
Sinus to sinus	0.30 cm.
Sinus to center	0.38 cm.
Sinus to apex	0.60 cm.
Widest (lobes)	0.58 cm.
Center to apex	0.83 cm. so diameter of flower flattened is 1.66 cm.

Corona: grooved below, edges of grove finely and deeply sulcate, apical area open, acute. column ca. 0.05 cm. tall 0.14 cm. across, anther wings extended and narrow. Dorsal surface also sulcate and concave near the inner apex center a small umbo, inner apex short, dentate, does not reach center but inner apex raised above the anthers.

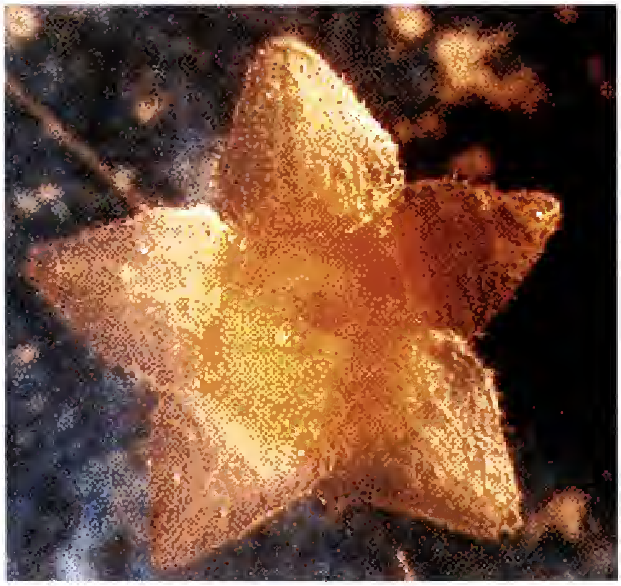
Apex to apex	0.41 cm.
Apex to center	0.45 cm. so the diameter is 0.90 cm.
Widest (scale)	0.20 cm.
Anther wing to aw.	0.41 cm.
Retinaculum to ret.	0.10 cm.
Anther wing to ret.	0.10 cm.

Pollinarium: Very long rather narrow pollinia, outer apex rounded and tapering inward. Pellucid margine on outside with a small tapering vacuole. Retinacula large, heavy thick translatore and small amber nearly clear caudicles.

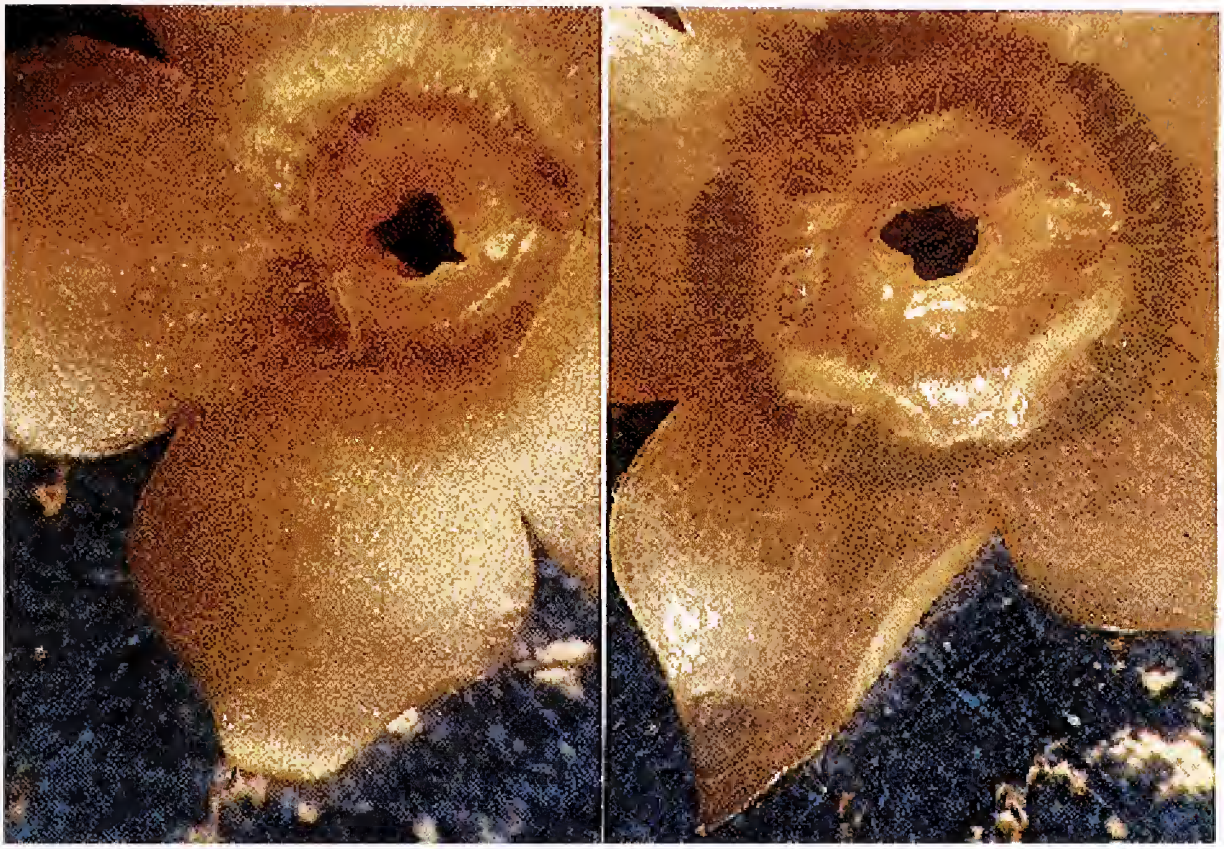
Pollinia	0.59 mm. long; widest 0.25 mm.
Retinacula	0.25 mm. long, shoulders o.12 mm wide, hip 0.09 mm.; waist slightly wider.
Translators	0.13 mm. long, 0.07 mm. thick, granular surface.
Caudicle bulb	0.05 mm. diameter.



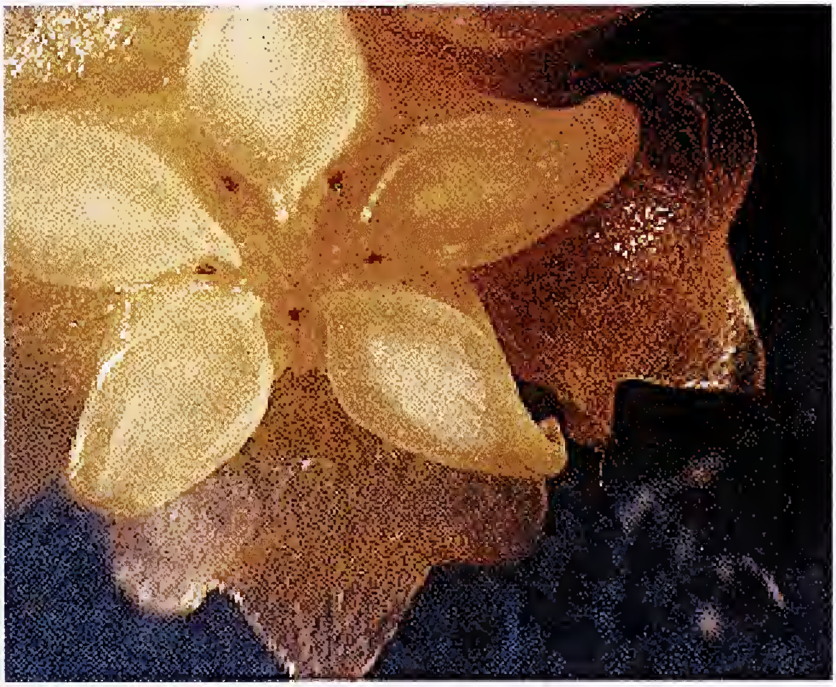
Side view of the pedicel, calyx and ovaries enlarged about 16X.Sepals are flat, granulose outside with a few scattered hairs, inside glabrous. Ovaries are dome shaped, short and with wide base. Ligules are present but difficult to deceme.



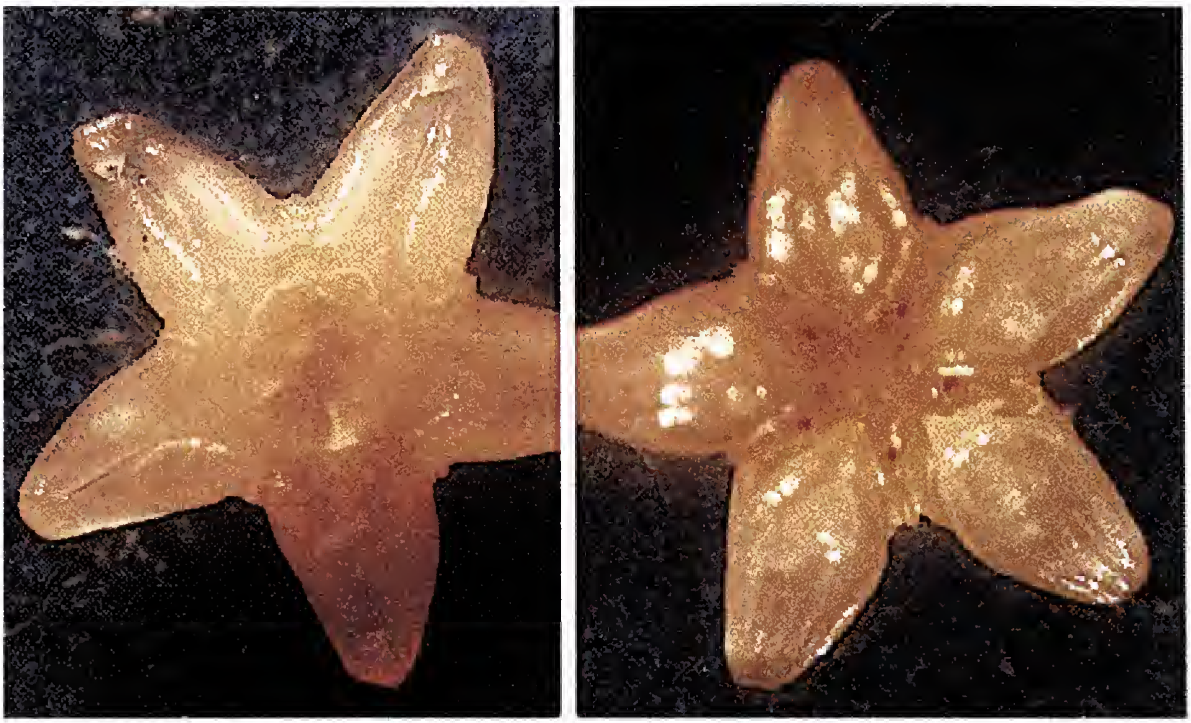
Top view of the calyx enlarged about 16X. The edges are sparsely ciliate, bases of sepals overlap very little, texture is membranous.



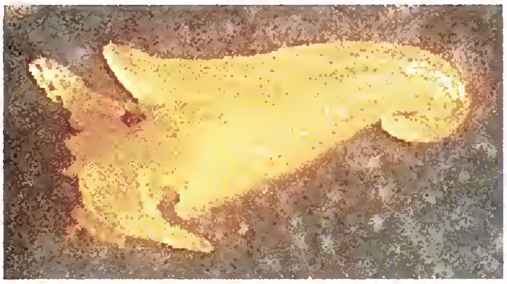
Inside and outside surfaces of the corolla enlarged about 15X. Inside surface is puberulous and outside is glabrous. Corolla lobes are deeply cut, broad with an acute apex, the area around the central collar is somewhat thickened.



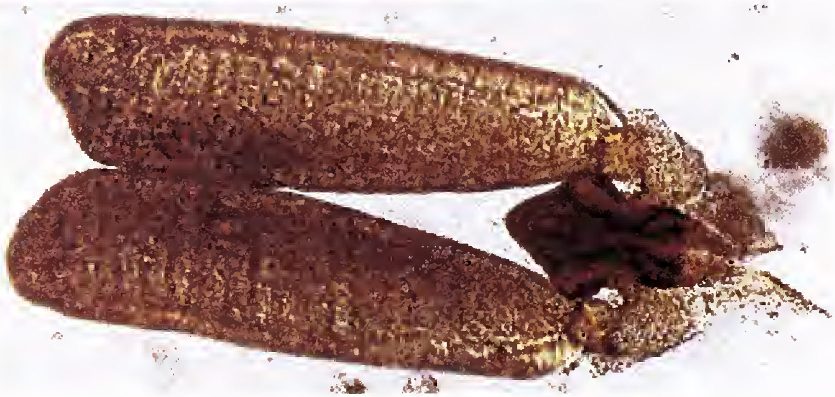
Top view of the flower enlarged about 15X. The outer lobe of the corona exceed the corolla sinus and are turned under. The inner lobe of the corona is short, dentate and does not nearly reach the crown center where the anthers are exposed. Anther wings are narrow (not doubled) and slightly exceed the cleft.



Bottom and top views of the corona enlarged about 15X. The outer apex is seen curving under over the grooved base. These surfaces are finely sulcate above and below. The dorsal surface is slightly concave with a low umbo toward the inner apex which here is very short, dentate and well short of the center.



Side view of a individual scale enlarged about 16X. Note the curved under outer apex, a scale which is not very thick and a curved up inner apex (dentate) not reaching the center where the anther is extended.



A side view of the pollinarium enlarged about 155X. The pollinia are long and narrow, the translators are thick with small caudicles. The retinaculum is fairly large with a broad shoulder area, hips not much enlarged. (to save room I have this laying on its side).

Hoya cystiantha Schlechter (The following pages were inadvertently left out of the previous issue.

First Description: subsequently in English.

In Flora of Indiae Batavae 2 (1856) 516. H. Zollinger & F. A. W. Miquel. 2. *Cystidianthus laurifolius* Bl. Mus. bot. I. p. 57. Leaves at bases generally acute, obverse oblong or lanceolate acuminate, leathery veined, 3-4 ½ inches long; flowers middle-sized, it is very similar to the preceding (*H. campanulata*) but ½ smaller, lobes erect triangular-ovate, acute. Sumatra (Praetorius, Korthals).

Other Literature:

In Annales Botanices Systematicae 3 (1848-1859) 63. W. G. Walpers. 2. *PH..* (Cystidianthus) *Laurifolium* Blume, Mus. bot. Lugd. Batav. 57. no, 141. t — Leaves oblong or lanceolate, both ends somewhat acute, leathery, veined; flowers medium sized. Habitat: in trees on the island of Sumatra.

In Museum Botanicum Lugduno-Batavum 1 (1849) 57. C. L. Blume. 141. *Cystidianthus laurifolius*. Bl.: leaves oblong or lanceolate both ends acute leathery veined; flowers medium size.

Appearance distinctly agreeing with *C. campanulata,* branches round very tenacious, below epidermal fibers somewhat delicately sericeous, very strong beneficial used techniques, held together, very twisted, slightly glabrous and at the nodes not at all thickened somewhat pubescent. Petiole 4 to 5 lines, compressed-round, grooved above downy rarely appressed. Leaves like Lauris nobilis, 3 to 4 inches, 1 1/3 to 2 inches wide, both ends somewhat acute and apex at acumen short nearly obtuse narrow, above on the petiole a obtuse acute gland, leathery, glabrous, veined, secondary reticulate veins, central nerve channeled above, below, in a like manner curved and veined prominently. Umbels between the petioles and terminal, solitary, simple, shortly pedunculate. Peduncles 3 to 4 lines, apex thickened and bracteated, small broad ovate ciliate obtuse. Pedicels 10 to 14 lines, narrow, glabrous. Calyx small leaflets ovate-oblong, obtuse, membranous, ciliate. Corolla like *C. campanulatum*, but smaller by half, limbs of the flaps erect triangular-oval acute. It lives in the forests of Sumatra.

In Flora of Indiae Batavae 2 (1856) 516. H. Zollinger & F. A. W. Miquel. 2. *Cystidianthus laurifolius* Bl. Mus. bot. I. p. 57. Leaves at bases generally acute, obverse oblong or lanceolate acuminate, leathery veined, 3-4 ½ inches long; flowers middle-sized, it is very similar to the preceding (*H. campanulata*) but ½ smaller, lobes erect triangular-ovate, acute.

In Annales Botanices Systematicae 3 (1848-1859) 63. W. G. Walpers. 2. *PH..* (Cystidianthus) *Laurifolium* Blume, Mus. bot. Lugd. Batav. 57. no, 141. t — Leaves oblong or lanceolate, both ends somewhat acute, leathery, veined; flowers medium sized. Habitat: in trees on the island of Sumatra.

In Kew Bulletin (1925) 85 H. N. Ridley. *Physostelma laurifolia* Ridley. Only some sprays of flowers were sent of this specimen, which I take to be the little-known *Cystidianthus laurifolius* Bl. which is hardly fully described and of which I have seen no specimens. The flowers are described as half the size of those of *P. campanualtum*, and the sepals are oblong, blunt and ciliate, which agrees with Blume's description, but tile corolla-lobes can hardly be described as acute. The flowers of Brook's specimen are crowded in a head about 30, on slender pedicels 3 cm. long; they are described as very pale brown. A specimen of Wray's collected in Perak at Relau Tujor, 4014, very closely resembles these specimens, but Gamble has passed it as *P. campanulatum*.

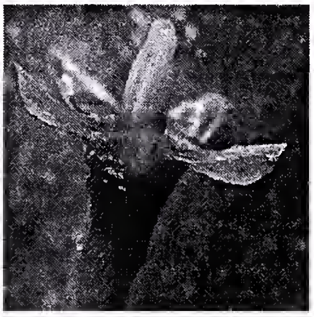
Lubok Tanudai, at 9000 ft., flowers very pale brown, no number.

Type Description:

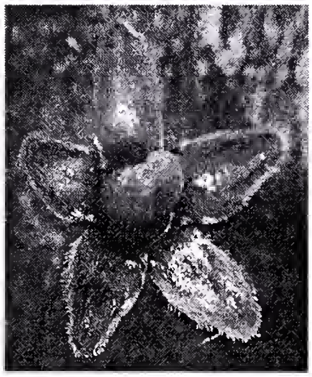
In Botanische Jahrbücher 50 (1913) 127. R. Schlechter. *H. campanulata* Decne Kommt auf der malayischen Halbinsel und Java vor und **H. cystiantha** Schltr. (*Cystianthus laurifolius* Bl.) ist sumatranisch.

Translation: *H. campanulata* exists on the Malayan peninsula and on Java, and *H. cystiantha* Schlechter (*Cystianthus laurifolius* Blume) is from Sumatra.

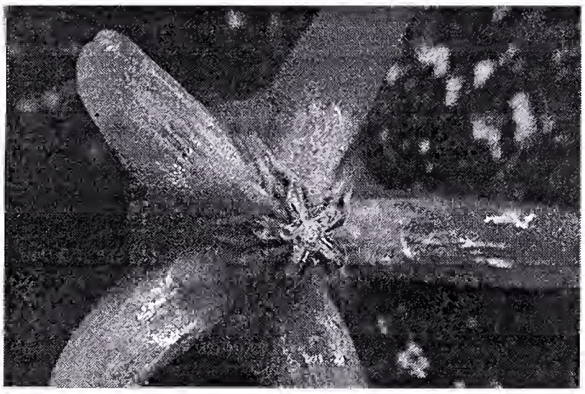
Photomicrographs:



Side view of the pedicel, calyx, and ovaries Enlarged 8X. Sepals are cupped inward, rather Thick and finely ciliate. The pedicel (only a Portion shown here is curved enlarging slightly As it nears the calyx, with parallel lenticular Longitudinal striations. The ovaries are columnar Bottle shapped

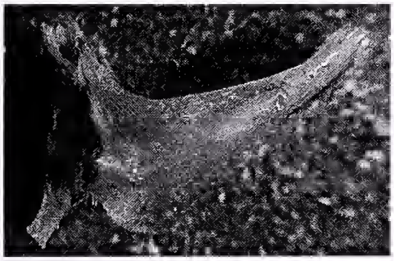


Top view of the calyx enlarged about 8X. Thesepals have a little of no overlap at the base, are rounded at the apex. Notice the fine even ciliation. The ligules at the base are very visible and easily observed, one ate each sinus. The base is symmetrically circular

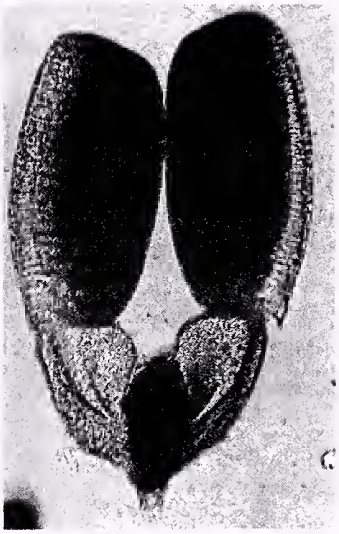


Top view of the corona enlarged about 8X. This is a large corona, the lobes are narrow and long, bifid at the outer apex. The upper surface is striate the inner lobe appears to be dentate, nearly all bilobed species have spatulate inner lobes. These inner lobes do not reach the center so the anthers are well exposed. The crown has considerable depth in the central portion.

Bottom view of the corona enlarged about 8X. Note the long narrow lobes with rounded (obtuse) ends, the lobes are grooved and finely sulcate; the areas around the column are covered with long stellate hairs, most pointing outward from the center.



Side view of the coronal scale enlarged about 8X. The inner lobe rises to the center but is overtopped by the anther. The lobe narrows as it approaches the outer apex.



Pollinarium enlarged approximately 8X, This is a beautiful structure, very distinctive. I am of the opinion that nearly every species could be delineated by its Pollinarium characteristics.

The pollinia are relativel short and very broad. Not how the pellucid edge cut off at the end near th caudicle leaving the en slightly protruding. Th translators are long an narrow in side view and th caudicles are perfectl formed and large. Th caudicles are supported b the translators which ar more broad on the top, rathe wedge shaped, here you se only the outer edge.

Critical Measurements:

Pedicel: terete, curved 3.8 cm. long, enlarged slightly toward the calyx, 1 mm. in diameter, lenticular parallel striations longitudinally.

Calyx: lobes finely and evenly ciliate, cupped, rather thick in the central portion. Lobes not fused or overlapped at the base with definite easily observed ligules at each sinus, 0.03 cm. long.

Ovaries: upright, bottle shaped 2 mm. tall base circular.

Corolla: campanulate, fluted into 5 envelopes (pleats) at outer half. Glabrous inside granulose outside. Short collar very small hole left from separation of calyx and corolla, Hairs directed inward toward center, around collar and extending to collar, lobes height of flower 1.3 cm. and same width.

Corolla flattened...........

Sinus to apex	0.05 cm.
Center to apex	1.5 cm.; so the flower is 3cm. in diameter.
Center to sinus	1.4 cm.
Apex to apex	1.5 cm.
Apex to sinus	0.55 cm.

Corona: inner lobe not free of the anther even at the apex. Column short 0.05 cm. tall, lower side of lobe finely sulcate and grooved down center. Stylar table shortly apiculate, cleavage of stigma visible.

Center to apex	0.54 cm.
Apex to apex	not recorded
Width (top)	0.15 cm.
Anther wing-aw.	0.25 cm.
Aw. to center	0.29 cm.
Retinaculum-ret.	0.10 cm.
Ret to center	0.10 cm.

Pollinarium:

pollinia	0.49 mm. long and 0.23 mm. at the widest.
retinaculum	0.22 mm. long; shoulder 0.11 mm. wide; waist 0.05 mm. wide; hip 0.10 mm. wide.
translators	0.25 mm. long
caudicle	bulb ca. 0.12 mm. widest.

Hoya Endings & Errors
By Dale Kloppenburg

Note: see Fraterna Volume 11 #1:1998 9-10 for endings *ense* and *ensis*.

Data gleaned from International Code of Botanical Nomenclature (ICBN) and Botanical Latin by William T. Stern. (BL).

ICBN 73.1. The original spelling of a name is to be retained except for corrections of topographic or orthographic errors.

Topographic errors: errors where the author (or the printer) made a mistake in spelling or observation. Example *Hertaeria alba* Ridley mistakenly printed for *Hertaeria alta* Ridley.

Orthographic errors: where the author mistakenly cited an incorrect name, *Glutta benghas* L. (1771) in error for *Glutta renghas* L. (the epithet by Linnaeus is "Renghas" not " Benghas".

Specific epithets may be substantive or adjectival.

Personal specific names: (ICBN) recommendation 73C.

(a) if the name ends in a vowel or er (substantive) epithets are formed by adding the genitive inflection as for the sex of the person honored: For a female Lace = lacae; for a male Edano = edanoi; for a name ending in er Loher = loheri

(b) if the name ends in a consonant (except er) the names are formed by adding i + the genitive inflection as for the sex of the person: for females Wayman = waymaniae; for a male Green = greenii.

(c) if the personal name ends in a vowel, adjectival epithets are formed by adding an plus the nominative singular inflection appropriate to the gender of the generic name (in the case of Hoya a female ending with no examples) Vanda lindley+ana. (lindleyana).

(d) if the personal name ends in a consonant, adjectival epithets are formed by adding i + an + the nominative singular appropriate for the sex of the genera. For the genus hoya, Pimentel = pimentel+i+an+a (Hoya pimenteliana).

It would be nice if the hoya (and other genera) endings indicated who collected the plant (e.g. in ii or ae) or if the species was named to honor someone (e.g. in iana) From (BL): Lindley in1832 preferred this to be the case. Many who have named species paid no attention to this. In the 1867 Botanical Congress Alphonse de Candolle put through an article, #33, that supported the above preferences. Ascherson protested against the rule in 1868. Most botanists continued to disregard it and in 1883 de Candolle declared the article void. Errors thus made intentional or unintentional are not (now) to be subject to change.

Q & A

Questions and Answers about HOYAS

1. Q. Now that the world wide web (www) is so poplar, how many sites do you suppose there are? A. More every day! I went to the new search engine "Google", typed in Hoya, Plants and it came up with 1,269. A few were duplicates. I have not tried to search all the other engines but I am sure there are more! That was in the fall issue. It is now August and I typed in Hoya plants again and the response was 3,450 Wow and it took 7 seconds.

2. Q. What is the best potting mix for my hoyas? A. For a short answer a well drained one, but this is a complex matter and depends on many variables: pot type and size, water quality, environmental conditions like humidity, exposure etc. If you live near the coast where the temperatures are moderated and the humidity relatively high the ideal mix can be much more porous, than one ideally suited for a low humidity area with big diurnal fluctuations in temperature. For potted hoyas peat moss forms a good base to build upon, add some porosity with some sponge rock, composted bark, sphagnum or other loose materials, keeping in mind that you want a moist media that drains quickly but stays damp for a couple of days or more. Take into account your environment. In some coastal areas even growing plants stapled to tree trunks might be ideal but would not work for most indoor culture. In my area a mix with composted bark although ideal on the California southern coast dries out too quickly with 5% humidity and 40 degree diurnal temperature fluctuations. You must experiment, then when you get it right use that mix entirely. It has been said that plants are either in a feast or famine situation when it comes to watering, when you water the plants roots are submerged so do not have access to oxygen, then the mix slowly dries, reaches an ideal condition and finally does not have enough surrounding moisture. How you water and your water quality will also be a factor in what you choose for a ideal potting mix. If the water has a high salt content or contains sulphur etc., you will need a mix in which the water can be flushed easily with each watering to remove any accumulated undesirable elements. Having an ideal mix and knowing when and how to water is the essence of growing plants. Keep learning.

3. Q. It has been intimated that too many hoyas are being named what do you think? A. Well for starters just the opposite. If you visit a herbaria you will find that with hoya sheets the bulk are unnamed and of those named a great proportion are misnamed. So a lot of people power needs to be applied to clean up this backlog. There are not an overwhelming number of people out collecting hoyas and the area covered in collecting is relatively very small. I would estimate that not 10% of available habitat has been collected or botanized. Even with so little being collected when we do collect we have a tendency to not collect things we have already collected and this may lead to a lot of material not being collected that may turn out to be new. On a 26 day collecting trip we probably will collect 100 cuttings and then it may take years to determine what we have. The backlog continues to grow and many of these collections contain as many unidentified or misidentified species as have been already determined. I'd say we have not, as yet, even began our work.

Send in your questions !!

BIRD TRACKS

From: Robin Director

Rosemary Peterson
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Long Beach, CA 90808
(562) 425-4765

Attention all IHA members! Give a membership of IHA to a friend, a plant enthusiast, or a family member, maybe best of all a young person. Young people are the future of any society so get them involved. Give a slide talk at your local school or church function. Take time to get involved in your association? Join a robin and meet nice people, exchange ideas, learn new things about Hoyas, exchange cuttings, increase your collection and have fun doing it? If not be brave and do so now! ....Above all, enjoy life!

Robin # 1 Margie OR. (May, 2000). Several hoyas are getting ready to bloom. *Dischorensis* is getting ready to bloom for second time. Two *onychoides* plants have buds, as does *calycina,* USDA 354244, CMF8, a fuzzy leaf one that has a golden bloom is getting ready to bloom again, As well as the old standards of *bella, lacunosa, multiflora, carnosa, obovata, longifolia* (loaded with flowers right now) and minibella will be a solid mass of flowers when it blooms (soon).

I have got some of the coconut fiber to line some wire baskets. Have a *Hoya carnosa* in one to see how it will do, and trying some orchids in some. Also using the coco-peat. It mixed with perlite was the only thing some affinis seeds rooted in. One orchid grower showed the difference of putting seedlings in it and regular orchid mix. Those in the peat did so much better. Thought I might try a carnosa in it. It doesn't harden if it gets dry the way peat moss does. I have been mixing it with peat moss, and perlite, to see what happens.

Robin #1. Harriette, CA. (May, 2000).. My hoyas are beginning to pick up for the summer, but I must admit to a bit too much neglect the last few months. Hope you can make it to the Hoya Group meetings. Just e-mail me for the December one.

Robin #1. Rosemary (July, 2000). My hoyas are putting on the best show in years. I am so proud of them. And my little year old seedling of serpens has graduated to outside and immediately set hree new leaves. Hooray!

I am looking forward to heading down to San Diego next week for a meeting of the Hoya group... Must bring some cuttings to share.

One of the nicest plants I have I drew at the Christmas party, and it was grown by the late Henry Rafael. Now I call it Henry's hoya, instead of bella. It is just loaded with flowers and is so delicate and sweet, I just love it!

Robin #3. Carite, Finland. I have had some new bloomers this Autumn. First *H. thompsonii,* which bloomed with extremely perfumed pure white flowers, It had only one umbel, but t was enough, the fragrance was so heavy. An other Autumn bloomer, *H. calycina* ssp. *calycina* had 7 umbels this year, and boys, the odor was terrible!! The buds opened one by one, so I had to smell the "perfume ala Horses" for one month! I could not take the buds away, even though I knew I hate the odor, because I wanted to photograph it. What a relief the slices succeeded fine and I need not to let it bloom any more (ok, yes, I admit, it will bloom again in next November when anything else is not blooming, I have no heart to take the buds away, even though I hate its odor). The flowers are very beautiful, pure white with blood red under the corona. And the flowers are big, more than an inch in diameter. And they last very, very long, nearly 2 weeks...and so does the fragrance, too, unfortunately.

Happy new century! Good hoya growing and blooming!

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For more information about the 2001 meeting dates:

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